IS 707 (2011): Timber Technology And Utilization of Wood, Bamboo and Cane - Glossary of Terms [CED 9: Timber and Timber Stores]

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*भारतीय मानक*

# टिम्बर प्रौद्योगिकी एवं लकड़ी, बाँस और बेंत के उपयोग — पारिभाषिक शब्दावली

*( तीसरा पुनरीक्षण )*

*Indian Standard*

# TIMBER TECHNOLOGY AND UTILIZATION OF WOOD, BAMBOO AND CANE — GLOSSARY OF TERMS

*( Third Revision )*

ICS 01.040.79; 79.020



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Timber and Timber Stores Sectional Committee, CED 9

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Timber and Timber Stores Sectional Committee had been approved by the Civil Engineering Division Council.

A series of Indian Standards covering timber and forest products has been published by Bureau of Indian Standards. These standards include a large number of technical terms relating to timber and forest/timber products. The extensive use of these terms and their likely misconstruction has necessitated the preparation of this glossary.

This standard was first published in 1958 and subsequently revised in 1968 and 1976. In the second revision of the standard all the terms used in various Indian Standards on timber and timber products published by the Bureau of Indian Standards, up to 1975 were included.

This standard is now being revised again to include a large number of additional terms commonly used in different aspects of timber technology and forest products utilization. However, since it is likely to take some time to finalize and include all such terms in this glossary at one time, it has been felt desirable to do so in a phased manner. Accordingly, it has been decided to include additional terms in respect of each of the following aspects of timber technology and forest products utilization as and when the definitions of the related terms are finalized:

a) Anatomy of wood, bamboo and rattan (cane);
b) Preservation and seasoning;
c) Wood poles;
d) Conversion and grading; and
e) Timber engineering.

The definitions of additional terms, relating to anatomy and utilization of bamboo/rattan not already covered in the second revision, have been finalized and are being included in this revision. Besides, a few of the terms already covered in the earlier version have also been revised.

In keeping with the above approach, the existing title of the standard has now been modified.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

*Indian Standard*

# TIMBER TECHNOLOGY AND UTILIZATION OF WOOD, BAMBOO AND CANE — GLOSSARY OF TERMS

*( Third Revision )*

## 1 SCOPE

This standard covers definitions of common terms applicable to timber technology and forest products utilization.

NOTE — Botanical features and other purely scientific terms are excluded from the scope of this standard.

## 2 REFERENCE

The standard listed below contains provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

| *IS No.* | *Title* |
|---|---|
| 1708 (Parts 1 to 18) : 1986 | Methods of testing of small specimens of timber (*second revision*) |

## 3 DEFINITIONS

**3.1 Additive** — Any material introduced prior to the final consolidation of a board to improve some property of the final board. Fillers and preservatives are included under this term.

**3.2 Adhesive** — A substance capable of holding materials together by surface attachment.

**3.3 Air-Dried Timber** — The condition of timber which has been subjected to air seasoning.

**3.4 Air-Seasoned Timber** — Timber seasoned in open air, usually protected from sun and rain.

**3.5 Air-Seasoning** — Seasoning done in open air, usually protected from sun and rain.

**3.6 All-Heart** — Timber containing heartwood only and completely free from sapwood.

**3.7 Anisotropic** — Exhibiting different properties when tested along axes in different directions.

**3.8 Annual Ring** — A co-axial layer of wood formed during one year of growth (*see* Fig. 1).

**3.9 At the Base** — A term which means 'at the ground level' while measuring the diameter of standing trees as contrasted with the terms 'at the stump' and 'at breast height'.

**3.10 At the Stump** — At the top level of stump.

**3.11 Back** — The side opposite to the face.

**3.12 Ballies** — Thin round poles with or without bark.

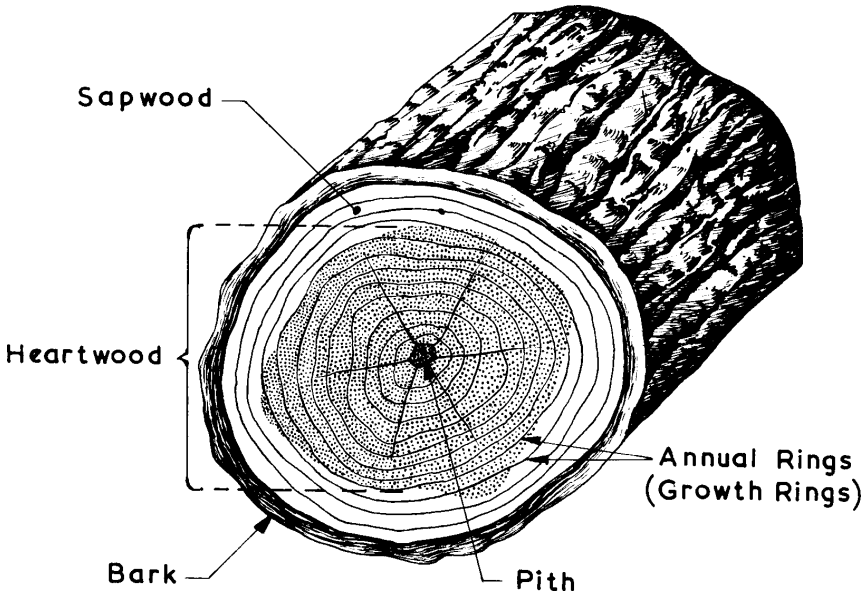



FIG. 1 CROSS-SECTION OF LOG

**3.13 Bamboo** — Tall perennial grasses found in tropical and sub-tropical regions. They belong to the family *Poaceae* and sub-family *Bambusoidae*.

**3.14 Bamboo Bore/GHOON Hole** — The defect caused by bamboo ghoon beetle (*Dinoderus* spp. *Bostrychdae*), which attacks felled culms.

**3.15 Bamboo Clump** — A cluster of bamboo culms emanated from a single mother rhizome over a time period at the same place.

**3.16 Bamboo Culm** — A single shoot of bamboo in a bamboo clump.

**3.17 Bamboo Joints** — A connection between two or more bamboo structural elements.

NOTES

**1** Lengthening joints and bearing joints are traditional bamboo joining methods. These joints lack stiffness and have low efficiency.

**2** The modern practices for bamboo jointing include gusset plated joints.

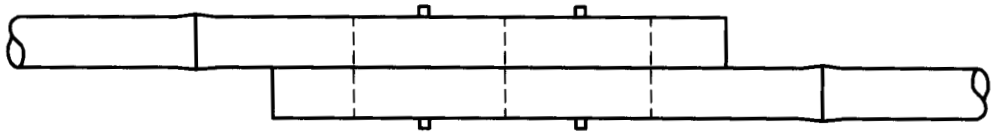
**3.17.1** *Lengthening Joints* (*End Jointing*)

**3.17.1.1** *Lap joints* — Joints in which the end of one piece of bamboo is made to lap over that of the other in line and the whole is suitably fastened. It may be full lapping or half lapping. Full section culms are overlapped by at least one internode and tied together in two or three places. Efficiency could be improved by using bamboo or hardwood dowels. In half lapping, culms shall preferably be of similar diameter and cut longitudinally to half depth over at least one internode length and fastened as per full lap joint (*see* Fig. 2).

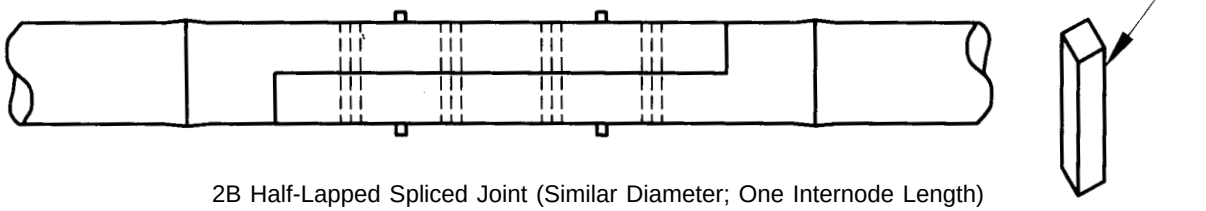
**3.17.1.2** *Butt joints* — Joints in which culms of similar diameter are butted end to end, inter-connected by means of side plates made of quarter-round culm of slightly large diameter bamboo, for two or more internode lengths. Assembly shall be fixed and tied preferably with dowel pins. This joint transfers both compressive and tensile forces equally well (*see* Fig. 3).

**3.17.1.3** *Sleeves and inserts* — Joints in which short length of bamboo of appropriate diameter are used either externally or internally to join two culms together (*see* Fig. 4).

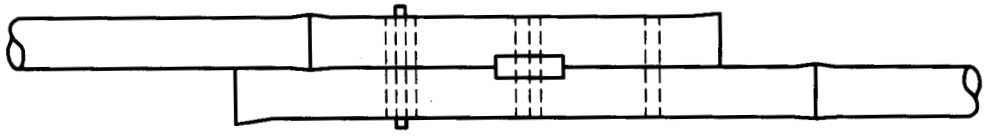
**3.17.1.4** *Scarf joints* — A scarf joint is formed by cutting a sloping plane 1 in 4 to 6 on opposite sides from the ends of two similar diameter bamboo culms to be joined. They shall be lapped to form a continuous piece and the assembly suitably fastened



2A Full-Lapped Spliced Joint (Over-Lapped at least One Internode)




2B Half-Lapped Spliced Joint (Similar Diameter; One Internode Length)



2C Lapped Spliced Joint with Pegs and Battens

FIG. 2 LAP JOINTS IN BAMBOO

by means of lashings. Using hooked splays adds to the strength and proper location of joints (*see* Fig. 5).

**3.17.2** *Bearing Joints* — Bearing joints are formed when members either bear against the other or cross each other and transfer the loads at an angle other than parallel to the axis.

**3.17.2.1** *Butt joints* — The simplest form of a butt joint consists of a horizontal member supported directly on top of a vertical member. The top of the post may be cut to form a saddle to ensure proper seating of beam for good load transfer. The saddle should be close to a node to reduce risk of splitting (*see* Fig. 6).

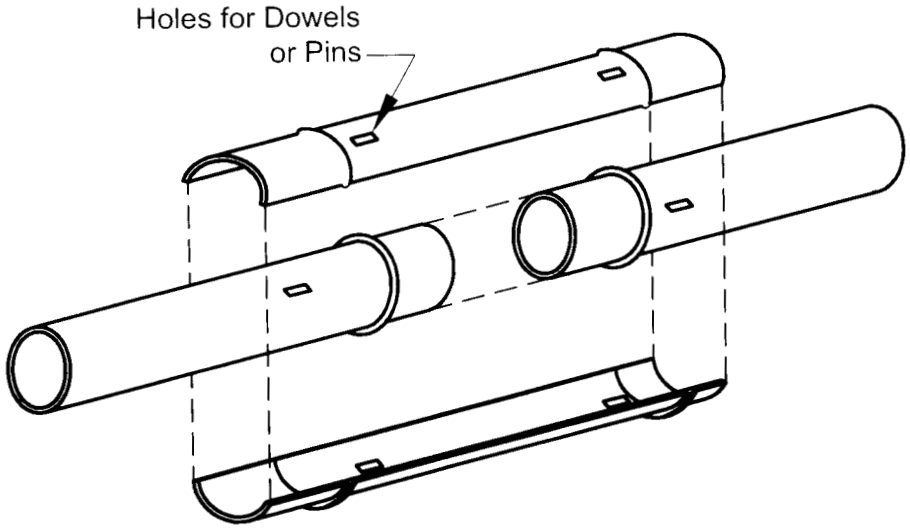



FIG. 3 BUTT JOINT WITH SIDE PLATES IN BAMBOO

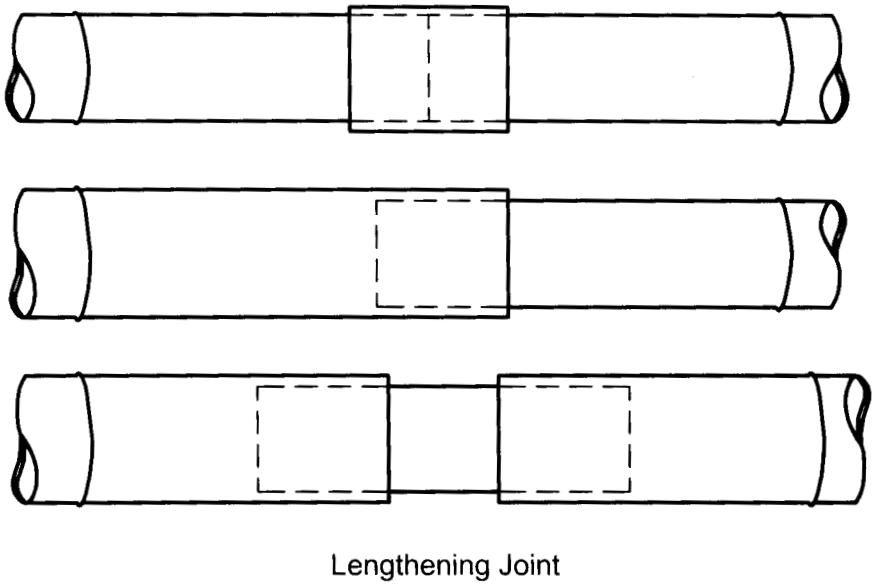



FIG. 4 SLEEVES AND INSERTS FOR BAMBOO JOINTS

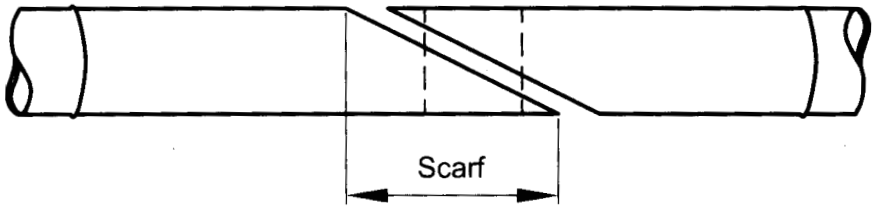
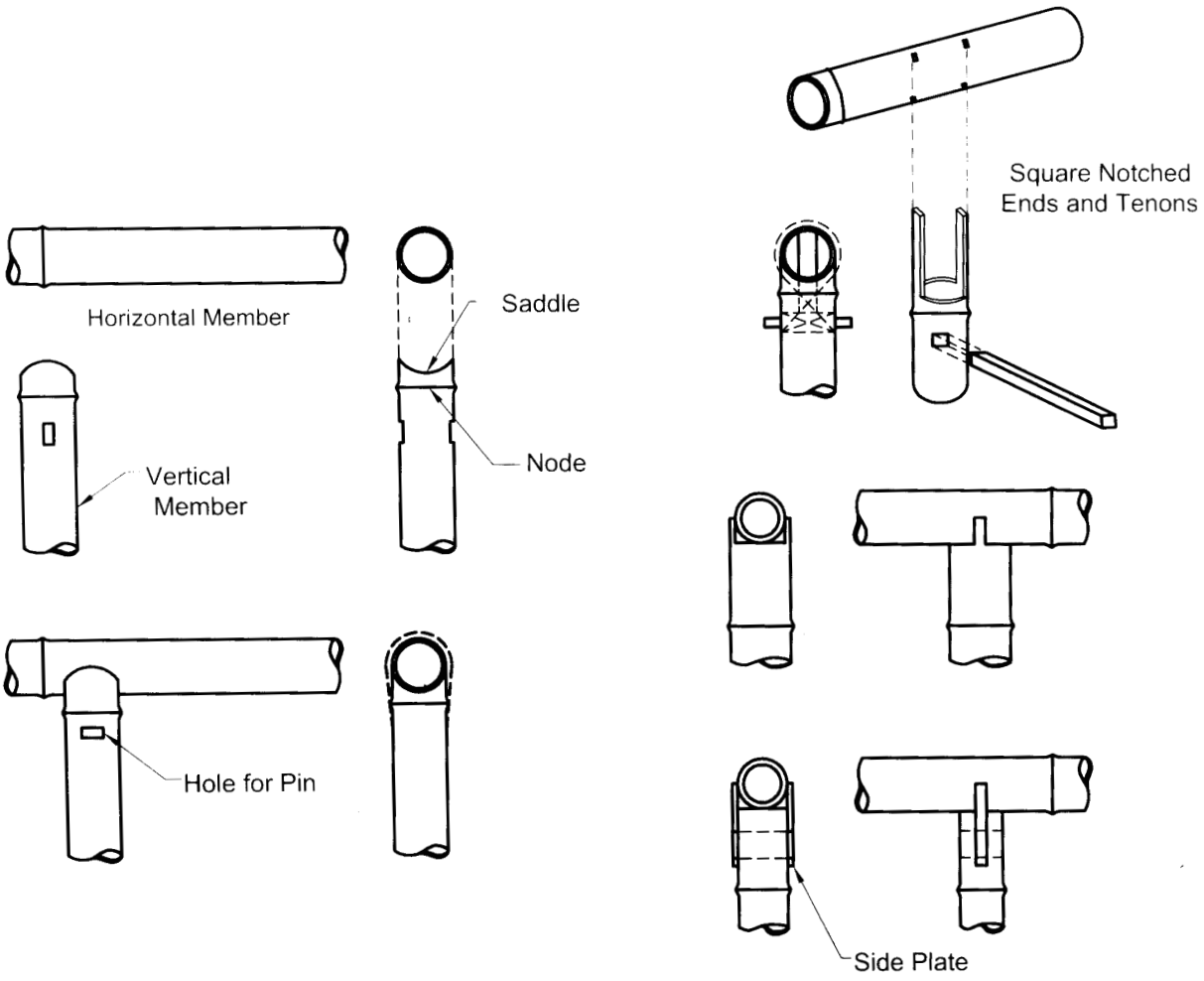



FIG. 5 SCARF JOINT IN BAMBOO




6A Saddle (Butt) Joint (Saddle to be Close to the Node)

6B Variations on Saddle Joint

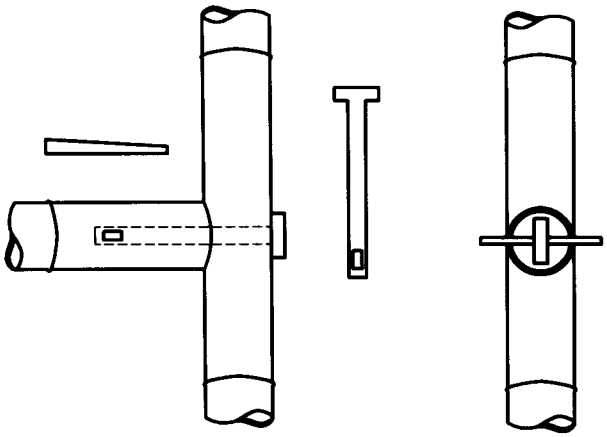
FIG. 6 BUTT JOINTS IN BAMBOO

**3.17.2.2** *Tenon joints* — Joints which are formed by cutting a projection (tenon) in walls of one piece of bamboo and filling it into corresponding holes (mortise) in another and keyed. It is a neat and versatile joint for maximum strength and resistance to separation (*see* Fig. 7).

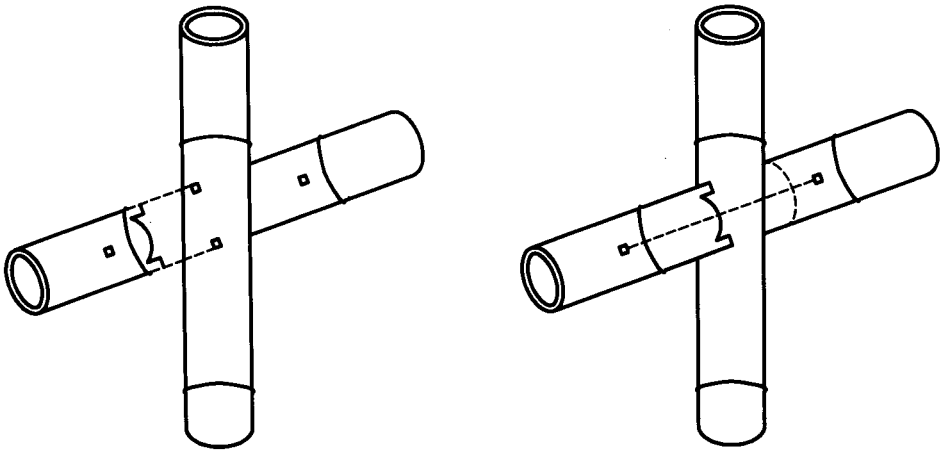
**3.17.2.3** *Cross over joints* — Joints which are formed when two or more members cross at right angles and its function is to locate the members and to provide lateral stability. In case of the joint connecting floor beam to post, it may be load bearing (*see* Fig. 8). Such joints are also used to transmit angle thrust.

**3.17.2.4** *Angled joints* — When two or more members meet or cross other than at right angles, angled joints are formed. For butt joints, the ends of the members may be shaped to fit in as saddle joints. Tenons would help in strengthening such joints (*see* Fig. 9).

**3.17.3** *Gusset Plated Joints* — Joints in which plywood or solid timber gusset plates are used at joint assemblies of web and chord connection in a truss and fixed with bamboo pins or bolts. Hollow cavities of bamboo need to be stuffed with wooden plugs (*see* Fig. 10).



7A Tenon and Key Joint



7B Integral Tenon (Horned) Joint

FIG. 7 TENON JOINT IN BAMBOO

**3.18 Bamboo Mat Board** — A board made of two or more bamboo mats bonded with an adhesive.

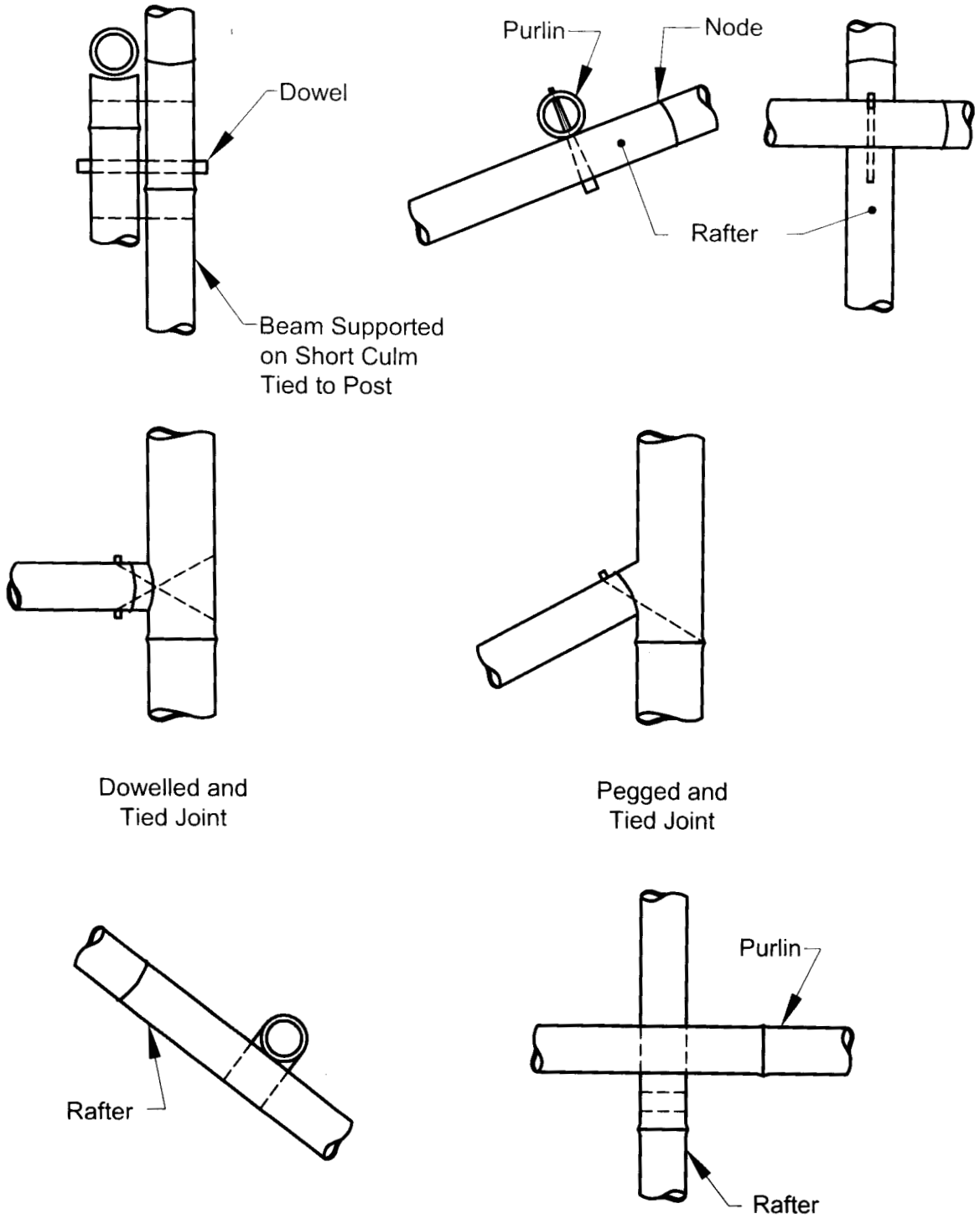
**3.19 Bamboo Mat Corrugated Sheet** — A sheet made up of adhesive soaked and coated mats assembled and pressed under specified temperature and pressure to obtain sinusoidal or other suitable corrugations.

**3.20 Bamboo Mat-Veneer Composite** — Panel manufactured with a combination of bamboo mat and veneer. Bamboo mat can be either used as outer skins or as core/cross-bands. However, the composite panel shall be a balanced construction on either side of central ply.

**3.21 Bark** — The covering or rind of a tree outside the wood (*see* Fig. 1).

**3.22 Bark Pockets** — Bark enclosed or occluded in the wood.

**3.23 Base Paper** — A printed or plain coloured absorbent paper normally having a weight of 60-140 g/m$^2$.




Alternative Purlin — Rafter Connection

FIG. 8 CROSS OVER JOINTS (BEARING JOINTS) IN BAMBOO

**3.24 Basic Stress** — The stress which is determined on small clear specimens of timber in accordance with standard practice and does not take into account the effect of naturally occurring characteristics and other factors.

**3.25 Batten** — A piece of sawn timber whose cross-sectional dimensions do not exceed 5 cm in either direction.

**3.26 Batten Board** — A board having a core made up of strips of wood usually 8 cm wide, each laid separately or glued or otherwise joined to form a slab which is glued between two or more outer

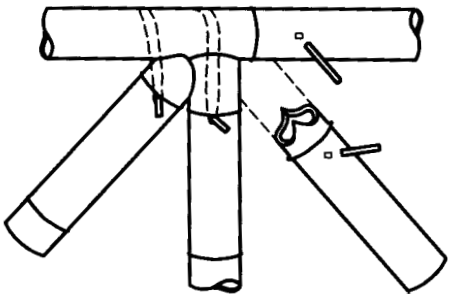


FIG. 9 ANGLED JOINT IN BAMBOO WITH INTEGRAL TENONS

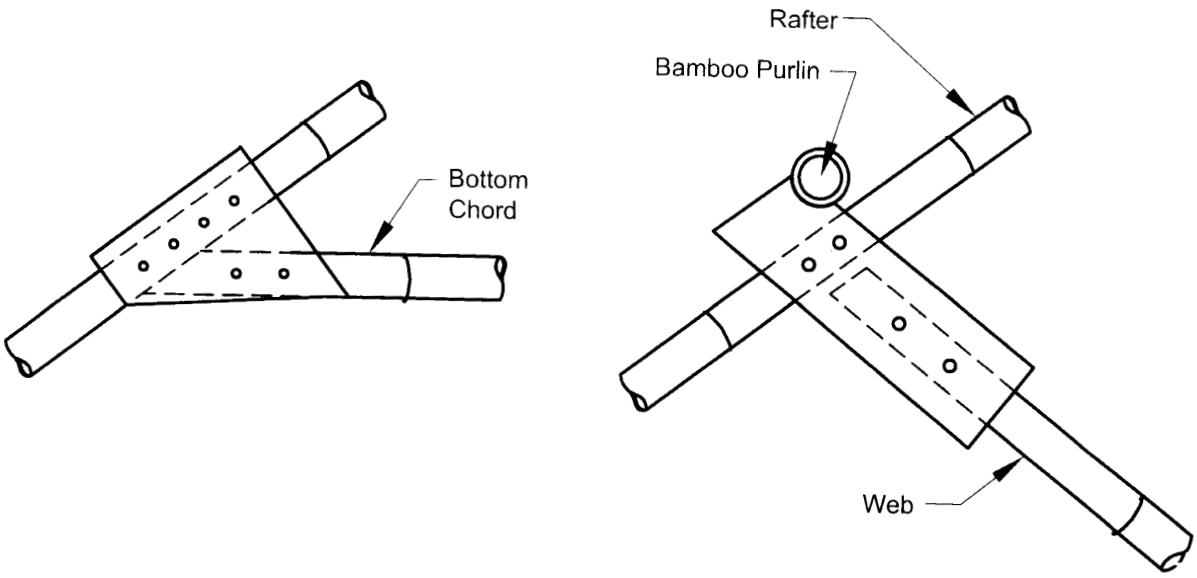



FIG. 10 GUSSET PLATED JOINTS IN BAMBOO

veneers with the direction of the grain of the core battens running at right angles to that of the adjacent outer veneers (*see* Fig. 11).

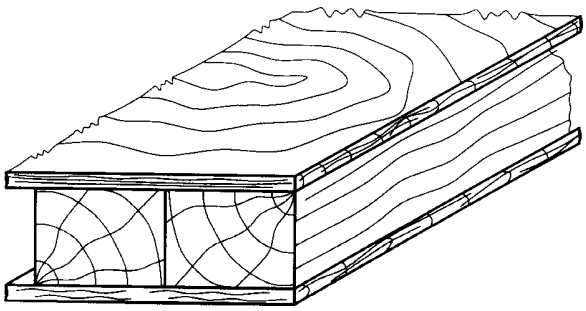


FIG. 11 BATTEN BOARD

**3.27 Baulk** — A piece of sawn timber whose cross-sectional dimensions exceed 5 cm in one direction and 20 cm in other direction.

**3.28 Beam** — A structural timber generally long in proportion to its width and thickness and used for supporting load primarily by its internal resistance to bending. In commercial practices it is sometimes used to mean 'flitches'.

**3.29 Bearer** — A beam supported at two or more points and provided for the purpose of distributing the loads to the different columns.

**3.30 Bee Hole** — Hole in the wood caused by the larvae of the Xyleutes Ceramica.

**3.31 Bent Wood** — Solid wood artificially bent to shape.

**3.32 Billet** — A short length of a thin stem or branch wood.

**3.33 Binder** — Organic binding material used for adhesion of timber members.

**3.34 Bird Peak** — A small hole or patch of distorted grain, sometimes associated with discoloration, attributed to birds.

**3.35 Blank** — Dimension stock timber from which the finished article is made.

**3.36 Blemish** — Anything that mars the appearance of wood, bamboo and cane but is not serious enough to be classed as defect.

**3.37 Blister** — A bulge on the surface due to a separation of the constituent plies or veneers, usually at a glue line.

**3.38 Blockboard** — Blockboard is a board having a core made up of strips of wood, each not exceeding 30 mm in width, laid separately or glued or otherwise joined to form a slab which is glued between two or more outer veneers, with the direction of the grain of the core blocks running at right angles to that of the adjacent veneers (*see* Fig. 12).

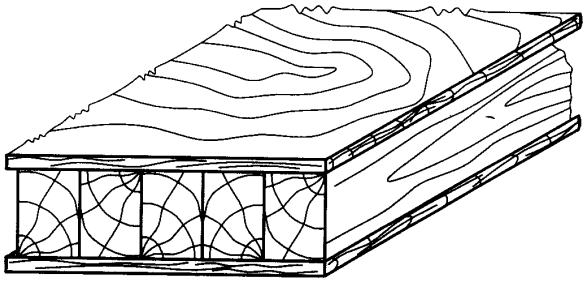


FIG. 12 BLOCK BOARD

**3.39 Blocking** — Any block or wood strip fastened to the inside of a crate to hold the contents in position.

**3.40 Blocks** — A series of compartments within a reasonable geographical area convenient for location and mapping.

**3.41 Board** — A term used to denote thin planks.

NOTE — The use of this term is deprecated.

**3.42 Bole** — The main stem of a tree without main branching.

**3.43 Bolt** — A short log 1.5 m or less in length.

**3.44 Bond** — Adhesion between two surfaces of two components of the wood.

**3.45 Bonding** — The process of uniting two or more pieces of wood or veneers by means of an adhesive. This process is characterized by continuity of the union over the whole of the areas of contact.

**3.46 Borer Hole** — A hole caused by the attack of wood boring insects and other organisms.

**3.47 Bow** — A curvature in a piece of timber along its face in the direction of its length (*see* Fig. 13).

**3.48 Boxed Heart** — A piece of timber, so sawn or hewn that the pith or the centre heart falls entirely within the four surfaces throughout its length (*see* Fig. 14).

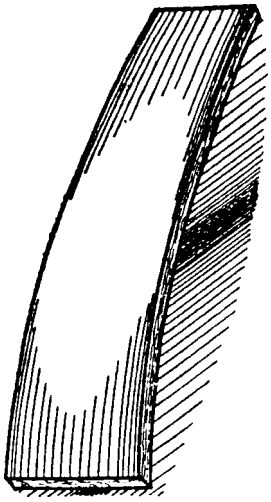


FIG. 13 BOW

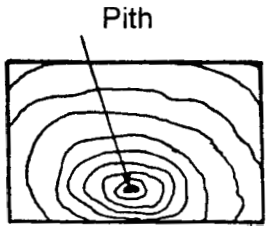



FIG. 14 BOXED HEART

**3.49 Box Type Corner** — A corner formed by four edge members so arranged that two of them are nailed with their wide faces together while the other two are nailed to the side grain of the first two.

**3.50 Braces** — Diagonal members in framework.

**3.51 Brashness** — Brittleness of wood caused by condition of growth, partial decay, dry rot or dote. It causes timber to break suddenly into two pieces without splintering when under stress. Such a tendency is also indicated by timbers of exceptionally low specific gravity or when the mass of the piece is far too low when compared to the average mass of other pieces of the same timber.

**3.52 Brash Wood** — Wood which is liable to break suddenly with little or no splintering.

**3.53 Break-Down** — Initial operation involved in sawing a log longitudinally from the round into cants and also converting cants into large sizes of timber preparatory to manufacture.

**3.54 Breaking Strength** — A term loosely applied to a given structural member with respect to the ultimate load it can sustain under a given set of conditions.

**3.55 Break-Off** — The uncut wood fibres left between the felling cut and felling sink.

**3.56 Breast Height** — See **3.66**.

**3.57 Brown Rot** — A type of wood-destroying fungus that decomposes cellulose and associated pentosans, leaving the lignin in unaltered state; the resultant mass of decayed wood of varying shades of brown.

**3.58 Bucking** — Cross-cutting of the felled tree perpendicular to the axis of the log.

**3.59 Bundle-Column** — A column consisting of three or more number of culm bound as integrated unit with wire or strap type of fastenings.

**3.60 Burl** — See **3.61**.

**3.61 Burr** — A large bulge or excrescence that is formed on the trunk or branches of a tree.

**3.62 Butt** — The end of bole or log nearer the stump.

**3.63 Butt-End** — The bottom end of the felled tree where the felling cut is given.

**3.64 Buttress** — An extraneous growth of the lower portion of the trunk.

**3.65 Cable Puller** — Device consisting of a system of lever pulley blocks and wire ropes employed to fell a tree in a given direction.

**3.66 Callipering Height** — Height above ground level at which the girth of a tree is generally measured. It is taken as 1.37 m.

**3.67 Callus** — Tissue which develops subsequent to an injury to a tree, the growth of which tends to cover the wound.

**3.68 Cambium** — The single layer of actively dividing cells (cambial initials) between bark and wood.

**3.69 Cant** — Thick piece of timber with or without squared edges, sawn from a flitch or a log and intended for further conversion into smaller sizes.

**3.70 Carriage** — A vehicle used to carry the log while it is being fed into the saw or saws for conversion into timber.

**3.71 Case Hardening** — A condition of timber during seasoning in which the different layers of wood are under stress by being under compression across the grain (usually due to rapid surface drying in the kiln).

**3.72 Cell** — A compartment bounded by a wall of its own constituting the basic structural unit of wood and other plant tissues.

**3.73 Cellular Board** — A plywood which consists of a core of cellular construction.

**3.74 Cellulose** — A carbohydrate, forming the fundamental material of all plants and a main source of the mechanical properties of biological materials.

**3.75 Cell Wall** — The limiting membrane of a cell usually comprising several layers particularly in wood.

**3.75.1** *Primary Cell Wall* — Outermost layer of cell wall adjoining middle lamella.

**3.75.2** *Secondary Cell Wall* — The walls formed inside the primary wall.

**3.76 Cement Bonded Panels** — Panels manufactured from wood wool, chips, particles, flakes, etc, of wood or other ligno-cellulosic material bonded together with cement and chemical additives. Wood constitutes the major part of the panel, by volume. This notably includes wood/cement blocks wherein the wood particles are of varying type.

**3.76.1** *Cement Bounded Particle Board* — Cement bonded panels made of wood particles of fairly uniform size and quality.

**3.77 Centre Heart** — The core of a log including the pith.

**3.78 Centre Internode** — A test specimen having its centre between two nodes.

**3.79 Chain Groove** — See **3.311**.

**3.80 Chamfering** — Bevelling or machining the sharp edge of a piece of timber.

**3.81 Characteristic Load** — The value of loads which has a 95 percent probability of not exceeding during the life of the structure.

**3.82 Characteristic Strength** — The strength of the material below which not more than 5 percent of the test results are expected to fall.

**3.83 Check** — A separation of fibres along the grain which is confined to one face of a piece of wood.

**3.84 Chip Marks** — Shallow dents in the surface caused by shavings that have clung to the cutters instead of passing off.

**3.85 Chipped Grain** — Minor chipping of surface of timber.

**3.86 Circular Saw** — A steel disc having a number of shaped teeth around its periphery.

**3.87 Clearance Angle** — The angle between the tangent to the cutting circle and the grinding back of the saw teeth.

**3.88 Clear Bole** — A bole that is free from branches.

**3.89 Clear Timber** — Timber which is free from defects and blemishes.

**3.90 Cleavability** — The ease with which bamboo can be split along the longitudinal axis. The action of splitting is known as cleavage.

**3.91 Closed Assembly Time** — The time elapsing between assembly of the joint components and the application of pressure.

**3.92 Closed Contact Adhesive** — A non-gap-filling adhesive suitable for use only in those joints where the surfaces to be joined may be brought into close contact by means of adequate pressure and where glue line exceeding 0.12 mm may be avoided with certainty.

**3.93 Coir Veneer Board** — A panel material manufactured with a combination of coconut fibre needled felt, veneer and jute fibres with kraft paper. Coconut fibre needled felt can be used as core/ crossbands or as outer skins formed with jute fibres and kraft paper. However, the composite ply should be a balanced construction on either side of central ply. The blended mass of glued fibres is laid to form a mat which is pre needled.

**3.94 Collapse** — The corrugated appearance of timber caused due to excessive but uneven shrinkage during drying.

**3.95 Column** — A structural member which supports load primarily by inducing compressive stress along the grain.

**3.96 Combination Boards** — Boards which have special properties as a result of the combination of two or more wood-based panels. The latter may be identifiable in their own right under other items of the classification, but under the present item they form an integral part of the panel. Examples are particle board in a plywood or hardboard sandwich.

**3.96.1** *Particle Board Core, Plywood Face* — Combination board consisting of particle board core and a plywood face, at least 2 plies on each side of the core

**3.96.2** *Other Combination Boards* — Combination boards other than those covered under **3.96.1**.

**3.97 Commercial Grading** — Also sometimes known as 'yard grading' or 'utility grading' refers to the principle by which the material is graded by consideration of usefulness of the material, and price factors.

**3.98 Common Rafter** — A roof member which supports roof battens and roof coverings, such as boarding and sheeting.

**3.99 Compartment** — A fixed territorial unit of a forest block for the purpose of administration and management of forest.

**3.100 Components of Fence** — Various items, such as posts, rails, strips, guy roads and fixtures, which go to form a pre-designed fence.

**3.101 Composite** — A product obtained by bonding galvanized iron sheet or aluminium sheet to plywood on one side or both sides.

**3.102 Composite Bolt** — Sticks from the upper and lower portions of the same log to be tested in a particular condition (green or dry) and bundled together.

**3.103 Composite Plywood** — A plywood whose core or certain layers are made of materials other than solid wood or veneers. There should normally be at least two cross-bonded plies on either side of the core.

**3.104 Compreg** — A wood-based laminated material made from thin wood veneers either impregnated under vacuum and/or pressure with synthetic resins or coated with synthetic resin or interlaid with synthetic impregnated paper and further bonded and densified under heat and pressure. The synthetic resins are usually of phenol and cresol formaldehyde type.

**3.104.1** *High Density Compreg* — Compreg with specific gravity between 1.25 and 1.35.

**3.105 Compression Failure** — Deformation caused by the wood being overstressed in compression due to normal forces during the growth of the tree or felling trees on irregular ground or rough handling of logs. The deformations range from well-defined buckling of the fibres, visible to the eye as wrinkles across the face of the piece, to slight crinkling of fibres.

**3.106 Compression Wood** — Abnormal wood, which is formed on the lower sides of branches and inclined stems of coniferous trees. It is darker and harder than normal wood but relatively low in strength for its mass. It may be usually identified by wide eccentric growth rings with abnormally high proportion of latewood.

**3.107 Conditioning** — The process designed to suit the moisture content of timbers to the conditions and purposes for which it is to be used.

**3.108 Coniferous** — The wood derived from trees classified botanically as 'Gymnospermae', for example *Abies, Picea, Pinus, Cedrus,* etc.

**3.109 Conversion** — The process of sawing timber.

**3.110 Core** — The inner layer or layers of a composite wood product.

**3.111 Core Board** — A general term for block board, laminated board and batten board.

**3.112 Core Plywood** — Plywood whose core (that is central layer, generally thicker than the other plies) is solid and consists of narrow planks, blocks or strips of wood placed side by side, which may or may not be glued together. This item includes blockboard, laminboard and battenboard and is sometimes also known as lumber core plywood.

**3.113 Correctly Paired** — The two halves of a pole are said to be correctly paired when they are not excessively loose within socket.

**3.114 Crack** — An actual rupture of the wood tissues, that is a separation of the fibres in the longitudinal direction.

**3.115 Crate Corner** — That part of a crate where its three faces meet.

**3.116 Crate Edge** — The line where two faces of a crate meet.

**3.117 Crook** — A short length of naturally curved timber.

**3.118 Crookedness** — A localized deviation from the straightness in a piece of bamboo.

**3.119 Cross Band** — A general term indicating a transverse layer of veneer or veneers in composite wood products.

**3.120 Cross Break** — Break or fracture across the grain of the wood.

**3.121 Cross-Cutting** — Cutting timber across the grain.

**3.122 Cross-Grained Timber** — Timber in which the fibre alignment deviates from a direction parallel to the long axis of the piece.

**3.123 Cross Wall** — A wall at the node of the bamboo closing the whole inside circumference and completely separating the hollow cavity below from that above.

**3.124 Crotch** — A fork in a log of wood.

**3.125 Cup** — A curvature in a piece of timber across the grain or width of the piece (*see* Fig. 15).

**3.126 Curvature or Sweep** — The deviation from the straightness of log, culm or a pole.

**3.127 Cutting Angle** — The angle between the face of the cutter and the line joining the cutting edge to the centre of the block.

FIG. 15 CUP

**3.128 Cutter Head Speed** — The rate, in revolutions per minute, at which the cutter head is revolving.

**3.129 Cutting Speed** — The speed at which timber is cut.

**3.130 Cylindrical Log** — A log is cylindrical when it has its least diameter at every cross section more than 80 percent of the greatest diameter at the same section, including flutes or trimmed buttresses within these limits.

**3.131 Dead Bamboo** — The bamboo which has died after flowering or injury to its stem. It is distinguishable by its dull greyish colour, lightness in weight and its brittleness.

**3.132 Dead Wood** — Timber produced from dead standing trees.

**3.133 Debark** — To remove the bark from a tree or a log.

**3.134 Decay** — Disintegration of wood tissues caused by fungi (wood destroying) or other micro-organisms.

**3.135 Decorative Veneers** — Veneers having attractive appearance due to figure, colour, grain, lustre, etc.

**3.136 Defect** — An abnormality or irregularity in wood which lowers its technical quality or commercial value by decreasing it in strength and affecting adversely its use or its appearance or in further conversion.

**3.137 Defibration** — The process of fibre separation under the influence of steam and heat, where lignin gets softened and the fibres can be separated from each other by a low energy output.

**3.138 Degrade** — Development of any defect, blemish or imperfection that lowers the grade of a piece of timber.

**3.139 Delamination** — Separation of plies, laminae or bamboo mats through failure of glue.

**3.140 Delimbing** — Cutting off the side branches of a felled tree flush to the stem.

**3.141 Diagonal Brace** — A frame member affixed to crate face at an angle of usually between 30 ° and 60 ° to the edge members of that face.

**3.142 Diameter at Breast Height/Callipering Height** — The diameter of a stem measured over bark at a height of 1.37 m from the ground level. Where the tree stands on a sloping ground, the height shall be measured from that side of the tree which faces the top of the slope.

**3.143 Dielectric Constant** — The ratio of capacitance of wood and capacitance of air is defined as dielectric constant or the electrical permittivity of the wood.

**3.144 Diffuse Porous Wood** — Wood in which the pores are of fairly uniform size and evenly distributed throughout the growth ring (*see* Fig. 16).

**3.145 Dimension Saw** — Saw blades which have a collection of rip and cross-cutting teeth.

**3.146 Dimension Stock** — Timber sawn to exact dimensions for a special purpose.

**3.147 Disc-Dowel** — A circular disc of very hard wood shaped in the form of a double conical frustum used for joining two pieces of timber in construction work.

**3.148 Discolouration** — A change from the normal colour of the wood or bamboo which does not impair the strength of the wood, bamboo or bamboo composite products.

**3.149 Distortion** — See **3.499**.

**3.150 Dog Board** — In sawing timber on a head saw, the last board in the log to which the carriage dogs are attached.

**3.151 Dogs** — The devices fixed to the saw mill carriages, whose function is to hold the log to keep steady during sawing.

**3.152 Dote** — Patch or streak of decay differing from surrounding wood chiefly in colour indicating incipient decay. It may be darker than the normal.

**3.153 Drag-Hole** — A hole cut near the end of a log to accommodate a drag chain.

**3.154 Dressed Timber** — Timber which has been sawn, planed and worked to the exact required condition.

**3.155 Dressing** — Initial preparation of a log for extraction or conversion. This includes removal of bark, branches, protuberances, buttresses, etc.

**3.156 Drilling** — Making round holes on the surface of timber by means of drilling machine or hand drill.

**3.157 Dubbling** — A thickness deficiency along the edge of a particle board caused by faulty sanding.

**3.158 Durability** — Resistance offered by wood to agents of natural destruction like insects and fungi.

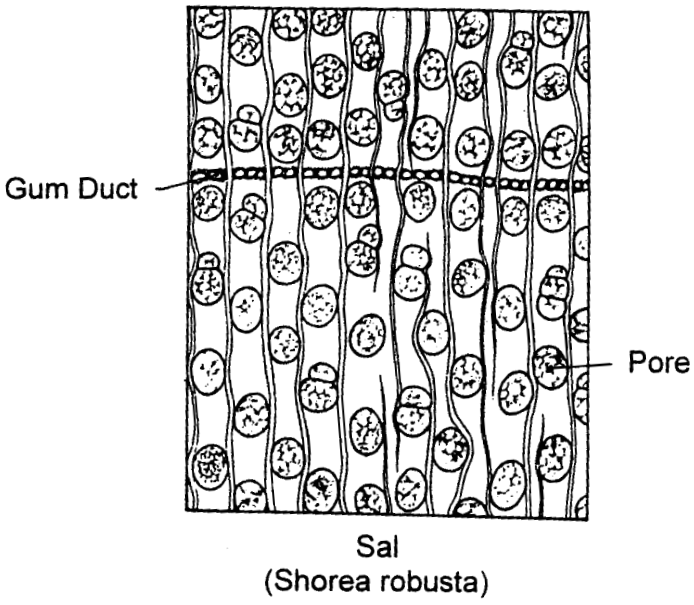



FIG. 16 DIFFUSE POROUS WOOD

**3.159 Duramen** — See **3.237**.

**3.160 Early Wood** — The portion of wood that is formed during the early part of the growth season, usually in the form of thin-walled cells.

**3.161 Edge Distance** — The distance measured perpendicular to the grain from the centre of the connector to the edge of the member.

**3.162 Edge-Grained Timber** — See **3.366**.

**3.163 Edge Members** — Those parts of the framework forming the edges of the crate.

**3.164 Edging** — Straightening the edges of a board with plane or machine.

**3.164.1** *Round Edge* — The edge which is a part of a circle.

**3.164.2** *Splayed Edge* — A chamfer extended to the full thickness of the timber.

**3.164.3** *Surface Edge* — Edge which is at right angles to either or both the surfaces.

**3.165 Edgings** — Strips, sometimes including bark also, which are cut from the edges of converted timber.

**3.166 Elastic Limit** — The greatest stress which a material is capable of developing without a permanent deformation remaining upon the complete release of the stress.

**3.167 Element** — A general term occasionally used as an alternative to cell.

**3.168 Elongation** — This term is used to describe the permanent change in length effected by the load. Elongation is sometimes referred to as permanent set.

**3.169 End Coating** — Coating applied to the ends of timber to retard end-drying and subsequent splitting.

**3.170 End Cracks** — Cracks appearing on the end surface of the timber or log.

**3.171 End Distance** — The distance measured parallel to the grains of timber/fibres of the bamboo from the centre of the connector/fastener to the closest end of the member.

**3.172 End Splitting** — A split at the end of a bamboo. This is not so common a defect as drying occurs both from outer and interior wall surfaces of bamboo as well as the end at the open ends.

**3.173 Epidermis** — In bamboos and cane, the outermost layer of culm often strongly thickened and cuticulerised outer wall.

**3.174 Equilibrium Moisture Content** — The moisture content which is attained by wood when placed in a constant condition of temperature and humidity

**3.175 Excelsior** — Long, narrow, curling wood shavings used as packing material. Syn 'Wood-Wool'.

**3.176 Excessive Charring** — Charring deeper than 3 mm.

**3.177 Extender** — A substance added to the adhesive either to reduce the cost of gluing or to improve flow properties and coverage.

**3.178 Extension** — The term is used to describe the total linear deformation caused by the load.

**3.179 Extruded Particle Board** — Particle board made by extrusion through a die. The particles lie with their larger dimensions mainly at right angles to the direction of extrusion.

**3.180 Face** — The outer sides/surfaces of panels (plywood, block board, flush door, medium density fibre board and particle board).

**3.181 Feed Rate** — The rate in millimetres per second at which material is passing through the machine.

**3.182 Felling Cut** — The cut given at the base of the tree for felling the tree which is on the side opposite the desired direction of fall of the tree and little above the felling sink.

**3.183 Felling Sink** — A notch cut at the base of the tree in the direction in which the tree is to be felled. It governs the direction of fall and also avoids splitting at butt-end (Syn. under cut).

**3.184 Fence Posts** — Pieces of timber of specified length, circular or rectangular in cross-section and which may be suitably connected to each other in vertical position to form a protective barricade to a place or building so as to prevent intruders.

**3.184.1** *Brick Posts* — Light fence posts between the main posts in a wooden fence used for supporting rails.

**3.184.2** *Cleft Fence Posts* — Segmental fence posts obtained only by splitting.

**3.184.3** *Pale Fence Strips* — Pointed pieces of wood, generally rectangular in cross section, used in pale fencing between two fence posts.

**3.184.4** *Rectangular Fence Posts* — Fence posts rectangular in cross section, obtained by sawing on all the sides.

**3.184.5** *Round Fence Posts* — Fence posts which are approximately circular in cross-section.

**3.184.6** *Segmental Fence Posts* — Fence posts having approximately a segmental cross-section throughout the length, obtained by either sawing or splitting a round fence post.

**3.185 Fibre** — A comparatively long, narrow cell of wood or bast with closed ends.

**3.185.1** *Gelatinous Fibre* — A fibre in which the secondary wall or a part of the same is more or less unlignified: it is a usual characteristic of tension wood.

**3.186 Fibre Board** — Panel product manufactured under pressure and heat from fibres of any wood or lignocellulosics with primary bond deriving from interfelting of the fibres.

**3.187 Fibre Saturation Point** — The condition of timber with respect to moisture content when all free water has dried out and the cell walls are saturated with moisture. Above this moisture content there is no significant variation in strength, shrinkage or other physical properties.

**3.188 Fibril** — A thread-like component of cell walls, visible under an optical or light microscope.

NOTE — This term, used without qualification, is equivalent to 'macrofibril' as opposed to ultrastructural 'microfibril'.

**3.189 Fibril Angle** — The angle between the longitudinal axis of the cells and the direction of the fibrils in the cell wall.

**3.190 Figure** — A general term applied to distinctive markings (usually decorative) on cut wood surfaces due to variations in colour, grain, lustre, etc, and structural features like knots, large rays, conspicuous growth rings and prominent parenchyma. The principal types of figures generally recognized are as follows:

**3.190.1** *Bear Scratch* — Figure produced by distortions of the grain which in finished timber has the appearance of elongated eyes.

**3.190.2** *Bird's Eye* — Figure on the flat-sawn and rotary-cut surface of wood exhibiting numerous rounded areas resembling small eyes, caused by small conical depressions on the fibres.

**3.190.3** *Blister* — Figure on smooth flat-sawn and rotary-cut surfaces having the appearance of more or less widely spaced, raised or depressed area of rounded contour, caused by undulations of the grain.

**3.190.4** *Burl or Burr* — Figure obtained from a burr, characterized by highly contorted grain and sometimes including numerous small knot-like growths or 'eyes' as in walnut, padauk, etc.

**3.190.5** *Crotch* — Figure obtained from a crotch, due to divergent course of the longitudinal elements. Cf. 'Curl' and 'Swirl'.

**3.190.6** *Curl* — Figure typical of veneers cut from near the heart of a crotch. Syn. 'Feather' and 'Plume'. Cf. 'Swirl'.

**3.190.7** *Curly* — Figure produced by an arrangement of the fibres in irregular curves. Syn. 'Curly Grain'. Cf. 'Fiddle Back' and 'Wavy'.

**3.190.8** *Feather* — See **3.190.6**.

**3.190.9** *Fiddle Back* — Figure produced by a type of fine wavy grain found in a few woods like maple and sycamore traditionally used for the backs of violins (fiddles). Cf. 'Curly' and 'Wavy.'

**3.190.10** *Mottle* — Figure produced by irregular wavy grain, giving the appearance of light and dark spots or blotches; several different forms of mottle are recognized.

**3.190.11** *Plume* — See **3.190.6**.

**3.190.12** *Quilted* — Figure having the appearance of quilted material.

**3.190.13** *Ribbon Grain* — See **3.190.16**.

**3.190.14** *Roe Grain* — See Note under **3.190.16**.

**3.190.15** *Silver Grain* — Figure produced on quarter-sawn timber by conspicuous broad rays, as in oak.

**3.190.16** *Stripe* — Figure produced on quarter-sawn timber by interlocking grain. Syn. 'Ribbon Grain'.

NOTE — 'Ribbon stripe' refers to a very regular stripe figure running more or less the full length of the pieces; 'broken stripe' or 'roe grain' to a discontinuous type of stripe figure.

**3.190.17** *Swirl* — Figure produced by irregular grain in the region of a crotch or knot.

**3.190.18** *Wavy* — Figure produced by an arrangement of fibres, etc, in the form of waves or undulations. Syn. 'Wavy Grain'. Cf. 'Curly' and 'Fiddle Back'.

**3.191 Fill** — Splash bars or splash slats as used in cooling towers. Splashing of water takes place on these bars.

**3.192 Filler** — An inert substance, such as wood flour, added to the adhesive to prevent excessive penetration of resin to the surface.

**3.193 Fine Saw** — Saws with numerous small teeth for cutting plywood and laminated boards.

**3.194 Fire Proofing** — A term usually employed to

indicate fire-retarding by suitable processing or treatment.

**3.195 Flame Retardant** — A substance when suitably added to the plywood reduces the rate at which the flame will spread across the surface of plywood or penetrate it.

**3.196 Flat Grained Timber or Tangential Sawn Timber** — See **3.342**.

**3.197 Flat-Pressed Particle Board** — Resin-bonded particle board manufactured by mixing particles of wood and/or other lignocellulosic materials of pre-determined sizes and shapes with synthetic resins and pressing in a parallel platen hot press of the usual multi-daylight type but my also be pressed in a continuous band type of press. The applied pressure is perpendicular to the plane of the board.

**3.198 Flatten Bamboo** — Bamboo consisting of culms that have been cut and unfolded till it is flat. The culm thus is finally spread open, the diaphragms (cross walls) at nodes removed and pressed flat.

**3.199 Flitch** — A piece of sawn or hewn timber whose cross-sectional dimensions exceeds 20 cm in any direction.

**3.200 Flush Door** — Flush door is a timber framed blockboard. It can be either solid or hollow core.

**3.201 Flute** — A natural longitudinal depression on the surface of a log usually near the butt end.

**3.202 Formation** — The laying of the blended mass of particles to form a mat for particleboard.

**3.203 Forming** — See **3.202**.

**3.204 Fortifier** — A substance used primarily to increase the water resistance and durability of hot setting urea resins.

**3.205 Framework** — The frame work is the structure consisting of the edge members, diagonal braces and struts that contribute primarily to the strength and rigidity of the crate.

**3.206 Full Culm** — The naturally available circular section/shape.

**3.207 Fundamental or Ultimate Stress** — The stress which is determined on a specified type/size of culms of bamboo, in accordance with standard practice and does not take into account the effects of naturally occurring characteristics and other factors.

**3.208 Gang Saw** — A saw in which several blades are mounted on a frame such that a whole log can be converted in a single pass.

**3.209 Gap** — A void in the core due to a split or due to edges of adjacent veneers not being close.

**3.210 Gap Filling Adhesive** — An adhesive suitable for use where the surfaces to be joined may not be in close or continuous contact owing either to the impossibility of applying adequate pressure or to slight inaccuracies in machining.

**3.211 Gauge (of the Saw Blade)** — Thickness of a saw blade.

**3.212 'Ghoon' Holes** — Holes caused by the activities of dinoderus beetles.

**3.213 Girdling** — To cut a ring through the bark and outer living layers of wood in a continuous incision all round the bole of a tree.

**3.214 Girth Battens** — Girth battens are those which are fixed all round the crate.

**3.215 Glue-Line** — The resultant layer of adhesive effecting bonding between any two adjacent wood layers in an assembly.

**3.216 Grade**

a) *Noun* — Accepted classification of timber or timber products according to quality.

b) *Verb* — To sort timber into different accepted classes.

**3.217 Graded Particle Board** — A board formed by arranging the particles of wood and/or other lignocellulosic materials in a graded manner such that the smallest particles form the top most layer and the largest particles form the middle layer. In graded particle board there is a gradual density gradient from the outer surfaces to the centre of the board across its thickness.

**3.218 Grain** — A term used rather loosely to refer to many different characteristics of wood, namely,

a) the general direction of the fibres or wood elements relative to the main axis of the piece, for example, cross, diagonal, dip, interlocked, spiral, straight and wild.

b) the plane to the cut surface, for example, edge, end, side and slash.

c) certain types of figures, for example, curly, ribbon, roe, silver, swirl and wavy.

d) defects in the worked surface, to which faulty working often contributes, for example, chipped, loosened, raised, torn and woolly.

e) the types of failure, for example, short grain.

f) as a synonym for texture, for example, close, coarse, even, fine, open and uneven.

It is recommended that the term grain be restricted to (a) only.

**3.218.1** *Across the Grain* — Any direction in the plane at right angles to the general direction of the fibres and other longitudinal elements of the wood. Syn. 'Perpendicular to the Grain.'

**3.218.2** *Along the Grain* — The direction of plane parallel to the length of the fibres and other longitudinal elements of the wood . Syn. 'Parallel to the Grain'.

**3.218.3** *Bastard Grain* — Timber or veneer, so sawn that the annual growth rings make angles of 30° to 60° with the surface of the piece.

**3.218.4** *Chipped Grain* — A defect caused by the breaking of the wood below the finished surface by the action of a tool or cutter.

**3.218.5** *Close Grain* — See **3.466.3**.

**3.218.6** *Coarse Grain* — See **3.466.1**.

**3.218.7** *Comb Grain* — See **3.366**.

**3.218.8** *Cross Grain* — A general term indicating that the alignment of the fibres and other longitudinal elements deviates from the direction parallel to the long axis of a piece of timber. It includes diagonal, spiral, and other deviations from straight grain. Cf. 'Straight Grain'. See also **3.218.31** and **3.218.32**.

**3.218.9** *Curly Grain* — See **3.190.7**.

**3.218.10** *Diagonal Grain* — The occurrence of fibres and other longitudinal elements at an angle to the longitudinal surfaces of a piece of timber owing to faulty conversion. Syn. 'Oblique Grain' and 'Sloping Grain'. Cf. 'Straight Grain'. See also **3.218.8**.

**3.218.11** *Dip Grain* — In wood, slight undulations in the fibres, such as occur around knots or resin pockets.

**3.218.12** *Edge Grain* — See **3.366**.

**3.218.13** *End Grain* — A cross-cut surface, that is, one at right angles to the general direction of the fibres. Cf. 'Side Grain'.

**3.218.14** *Even Grain* — See **3.466.2**.

**3.218.15** *Fine Grain* — See **3.466.3**.

**3.218.16** *Flat Grain* — See **3.342**.

**3.218.17** *Fuzzy Grain* — See **3.218.41**.

**3.218.18** *Interlocked Grain* — A type of grain in which the alignment of the fibres or vertical elements changes direction or reverses periodically in successive layers. Syn. 'Interwoven Grain'.

NOTE — Alternating spiral grain is a special case of interlocked grain.

**3.218.19** *Loosened Grain* — A defect on a flat sawn surface caused by the separation or raising of wood fibres along the growth rings. Cf. 'Raised Grain'.

**3.218.20** *Open Grain* — See **3.466.1**.

**3.218.21** *Quarter Grain* — See **3.366**.

**3.218.22** *Raised Grain* — A defect primarily due to the use of blunt cutters, consisting of a roughened condition of the dressed surface of timber, in which some portions of the growth layers are higher than others; it is accentuated by differential shrinkage. Cf. 'Loosened Grain'.

**3.218.23** *Ribbon Grain* — See **3.190.16**.

**3.218.24** *Rift Grain* — See **3.366**.

**3.218.25** *Roe Grain* — See **3.190.16**.

**3.218.26** *Ruptured Grain* — A condition of slight breaks in the veneer, caused by irregular grain or improper cutting.

**3.218.27** *Short Grain* — See **3.51**.

**3.218.28** *Side Grain* — Any surface cut parallel to the general direction of the fibres. Cf. 'End Grain'.

**3.218.29** *Silver Grain* — See **3.190.15**.

**3.218.30** *Slash Grain* — See **3.342**.

**3.218.31** *Slope of Grain* — The inclination of the fibres to the longitudinal axis of the members.

NOTE — It is measured as a gradient expressing the ratio of two sides of a right angled triangle, one parallel to the longitudinal axis of the member and the other perpendicular to it.

**3.218.32** *Spiral Grain* — Grain in which the vertical elements are aligned spirally in the bole of a standing tree or a log.

**3.218.33** *Straight Grain* — Grain in which the fibres or longitudinal elements are aligned parallel to the axis of the tree or the longitudinal surface of a piece of timber.

**3.218.34** *Swirl Grain* — Irregular grain usually surrounding knots and crotches. See also **3.190.5** and **3.190.17**.

**3.218.35** *Torn Grain* — A machine defect of surfaced timber where the fibres of the wood have been torn out around knots and curly places by the action of planer knives, tools or other matters. See also **3.478**.

**3.218.36** *Twisted Grain* — See **3.218.32**.

**3.218.37** *Uneven Grain* — See **3.466.4**.

**3.218.38** *Vertical Grain* — See **3.366**.

**3.218.39** *Wavy Grain* — See **3.190.18**.

**3.218.40** *Wild Grain* — Irregular grain running in various directions often within a restricted area.

NOTE — It is often the cause of distortion and rough patches on the surface of dressed timber or veneer. See also **3.218.34**.

**3.218.41** *Woolly Grain* — A defect caused by the tendency of the fibres to fray out in machining, so producing a rough surface. Syn. 'Fuzzy Grain'

**3.219 Green Timber** — Freshly felled timber which has not lost much of its moisture or timber which still contains free water in its cell cavities. Moisture content of such timber is above fibre saturation point.

**3.220 Ground Line** — The girth line up to which a wood pole may be fixed in ground in actual use.

**3.221 Growth Rate** — In timber, confined to the radial increase and commonly expressed as the number of growth rings per linear unit measured radially on the cross-section of a log or piece of converted timber.

**3.222 Growth Ring** — A layer of wood apparently produced in one growing season. The duration of a growing season may not always be one year.

**3.222.1** *Discontinuous Growth Ring* — A growth ring that is not traceable all round the stem as viewed in cross-section.

**3.222.2** *False Growth Ring* — One of the growth rings of a double (or multiple) ring.

**3.223 Growth, Secondary** — Growth due to the activities of cambium.

**3.224 Gullet** — Space in a saw blade between successive teeth to carry the saw dust.

**3.225 Gum Ducts** — Special tubular passages containing gum or resin. A term mostly used in porous wood.

**3.226 Gum Pocket** — Cavity of any size in wood which contains or has contained gum.

**3.227 Gum Spot and Streak** — An accumulation of gummy substances occurring as a small patch or streak in timber. It is similar to pitch pocket or pitch streak.

**3.228 Gum Vein** — A local accumulation of gum in the form of a streak or shield-like tangential plate of varying size, as seen on the longitudinal surface.

**3.229 Guy Rod** — A supporting inclined piece of timber used along with the vertical post particularly at the corners of the fence.

**3.230 Gypsum Board** — Panels manufactured from chips, particles, flakes etc. of wood or other lingo-cellulosic materials, bonded together with mineral binders other than cement and chemical additives.

**3.231 Half Wrought** — Semi-finished timber on which further operations have to be done either by hand or by machine in order to complete the process.

**3.232 Hardboard** — Panel material generally exceeding 1.5 mm in thickness manufactured from lignocellulosic fibre with the primary bond deriving from the felting of the fibres and their inherent adhesive properties.

**3.232.1** *Classification According to Production Process*

**3.232.1.1** *Hardboard, dry process* — Hardboard produced by a dry process.

**3.232.1.2** *Hardboard, wet process* — Hardboard produced by a wet process.

**3.232.2** *Classification According to their Method of Manufacture, Thickness, Density, Specific Properties, Conditions of Use or Application Purposes*

**3.232.2.1** *Medium hardboard* — Homogenous fibre hardboard having uniform thickness and having density above 350 kg/m$^3$ but below 800 kg/m$^3$.

**3.232.2.2** *Standard hardboard* — Homogenous fibre hardboard having uniform thickness and having density of 800 kg/m$^3$ to 1 025 kg/m$^3$.

**3.232.2.3** *Tempered hardboard* — Hardboard, which has been further treated to improve or modify one or more properties of the final board and having a density of 800 kg/m$^3$ to 1 025 kg/m$^3$.

**3.233 Hardener** — A material used to promote the setting of the resin. It may be either in liquid or powder form. It is an essential part of the adhesive, the properties of which depend upon using the resin and hardener as directed.

**3.234 Hardwood** — A conventional term used to denote the wood of broad-leaved trees. It has no relationship with the physical properties of hardness or strength. On account of the confusion this word has caused, its use is discouraged.

**3.235 Harmless Insect Hole** — Insect hole with no living borers and not exceeding 1.6 mm in diameter.

**3.236 Heart Centre** — See **3.77**.

**3.237 Heartwood** — The inner portion of wood in a tree or a log, which is generally of a darker colour. It is usually devoid of living cells and reserve materials like starch and, therefore, is less liable to insect and fungal attack than sapwood.

**3.237.1** *False Heartwood* — Wood discoloured by natural causes, such as fungus, frost and abnormal conditions of growth, so that it simulates heartwood, often markedly irregular in shape as seen on a cross-section of the log. Examples of false heartwood are blackheart and frost heart. Syn. 'Pathological Heartwood'.

**3.237.2** *Ripewood* — Heartwood which does not show appreciable difference in colour from sapwood, as in fir, mango, semul, gamari, etc.

**3.238 Heart Rot** — Decomposed and discoloured central portion of the log resulting from decay.

**3.239 Hemi Cellulose** — The polysaccharides consisting of only 150 to 200 sugar molecules, also much less than the 10 000 of cellulose.

**3.240 Hewn Timber** — Timber converted to size by an axe or adze. The ends are sometimes sawn.

**3.241 Holes** — Cavities caused by worms, insects, birds or mechanical means.

**3.241.1** *Large Hole* — Hole above 12 mm in diameter.

**3.241.2** *Pinhole* — Hole not over 2 mm in diameter, usually darkly stained and not containing bore dust or frass.

**3.242 Hole Zone** — Area around holes or slots causing a ring of about 2.5 mm width.

**3.243 Hollow Centre** — A log is said to be affected with hollow centre, when its centre heart (pith) is partially or completely removed with or without partial removal of the heartwood.

**3.244 Hollow Heart** — A cavity in the heart of the bole resulting from decay.

**3.245 Honeycombing** — Internal cracks (separation of fibres) in timber due to drying stresses.

**3.246 Hook** — The angle between the front face and a line from the tooth point to the centre of the circular saw or perpendicular to the back of a band saw.

**3.247 Horizontal** — The main horizontal members interconnecting columns.

**3.248 Immature Bamboo** — The bamboo having bud scars on the stem. It is distinguishable by its dull yellowish colour.

**3.249 Immature Cane** — Cane, which discolours readily, is brittle and shrinks badly.

**3.250 Impregnated Base Paper** — A base paper, printed or plain coloured, impregnated in any suitable synthetic resin and dried to a volatile content of 4 to 8 percent.

**3.251 Impregnated Overlay** — An overlay paper impregnated in any suitable synthetic resin and dried to a volatile content of 4 to 8 percent.

**3.252 Inbark** — Patches of bark partially or wholly enclosed inside the stem of a tree by later growth.

**3.253 Incipient Decay** — See **3.152**.

**3.254 Inner Diameter** — Diameter of internal cavity of a hollow piece of bamboo.

**3.255 Insect Damage** — Damage caused by insects and their larvae.

**3.256 Insulating Board** — Fibreboard with a density usually not more than 0.35 g/cm$^3$, sometimes known as softboard.

**3.256.1** *Insulating Board, Impregnated or Otherwise Treated* — Insulating board which has been impregnated (for example with bitumen) or otherwise treated to reduce water absorption and to improve stability and other physical and mechanical characteristics.

**3.256.2** *Other Insulating Board* — Insulating board which has not been impregnated or otherwise treated.

**3.257 Insect Hole** — See **3.46**.

**3.257.1** *Harmless Insect Hole (Borer Hole)* — Insect hole with no living borers, and not exceeding 1.6 mm in diameter.

**3.258 Internode** — The portion of bamboo between two nodes.

**3.259 Interslivers** — The overlapping area of the slivers in the mat.

**3.260 Irregular Grain** — A comprehensive term, covering all cases where the grain, noticeably, is not parallel to the appropriate edges and to the face of the veneer. The main forms of irregular grain are short grain, wavy grain and wild grain.

**3.261 Joint** — A prepared connection for joining adjacent pieces of wood, veneer, etc.

**3.261.1** *Butt Joint* — Joint in which two pieces of timber are joined end to end usually across the grain. Sometimes dowels are used in such a manner that half of the dowel is thrust in each piece (*see* Fig. 17).

FIG. 17 BUTT JOINT

**3.261.2** *Combed Joint* — A joint formed by series of tenons engaged in corresponding slots (*see* Fig. 18).

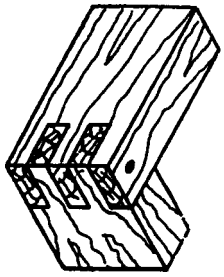


FIG. 18 COMBED JOINT

**3.261.3** *Dovetail Joint* — A joint at the corner of two pieces in such a way that the notches made on one are fitted exactly into projections of corresponding size and shape made in the other. There are various kinds of dovetail joints, for instance, lapped dovetail joint and wedge shaped dovetail joint, joined in a way which will resist withdrawal except in the direction in which it was assembled (*see* Fig. 19).

**3.261.4** *Dowel Joint* — A joint in which dowels or pegs are placed in corresponding holes made on the two joining faces (*see* Fig. 20).

**3.261.5** *Edge Joint* — A joint made between two pieces of timber or veneers in the general direction of the grain (*see* Fig. 21).

**3.261.6** *End Joint* — A joint made between two veneers across the grain.

**3.261.7** *Finger Joint* — An end joint made up of several meshing wedges or fingers of wood bonded together with an adhesive.

**3.261.8** *Lap Joint* — A joint in which two pieces of timber are jointed in such a way that one overlaps the other and the entire surface may or may not remain continuous (*see* Fig. 22).

**3.261.9** *Halved Joint* — A lap joint in which the timber is reduced to half section upto a certain length at one end/edge in both the pieces, which are lapped one on the other and joined (*see* Fig. 23).

**3.261.10** *Scarf Joint* — A lap joint in which the ends or edges are bevelled and the entire surface remains continuous (*see* Fig. 24).

**3.261.11** *Mitred Joint* — A joint between two members at an angle in which the jointing surfaces are cut to corresponding edges at the intersection.

**3.261.12** *Mortise and Tenon Joint* — A joint in which the reduced end (tenon) of one member fits into the corresponding slot (mortise) of the other (*see* Fig. 25).

**3.261.13** *Tongue and Groove Joint* — A joint in which a tongue is provided on edge of one member to fit into a corresponding groove on edge of the other (*see* Fig. 26).

**3.262 Jointed Pole** — A pole which is obtained by joining short length members.

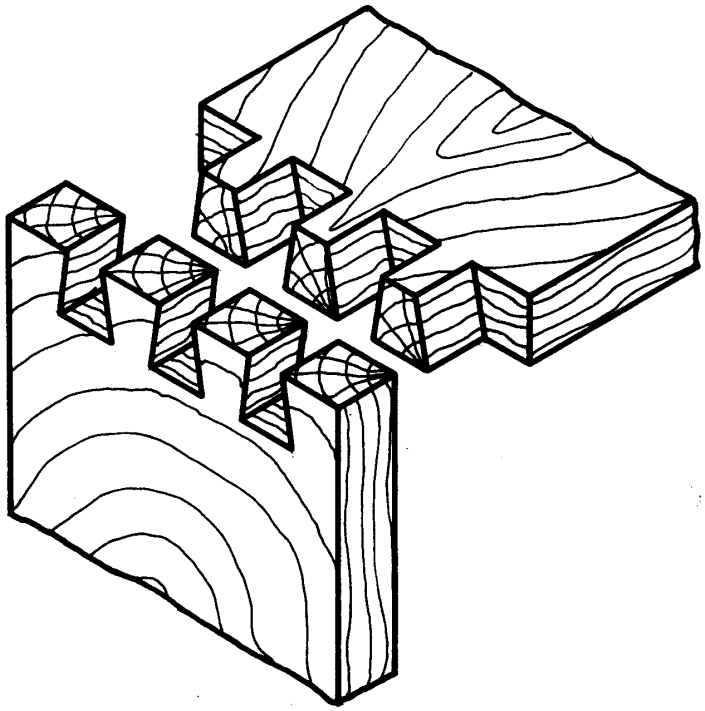


FIG. 19 DOVETAIL JOINT

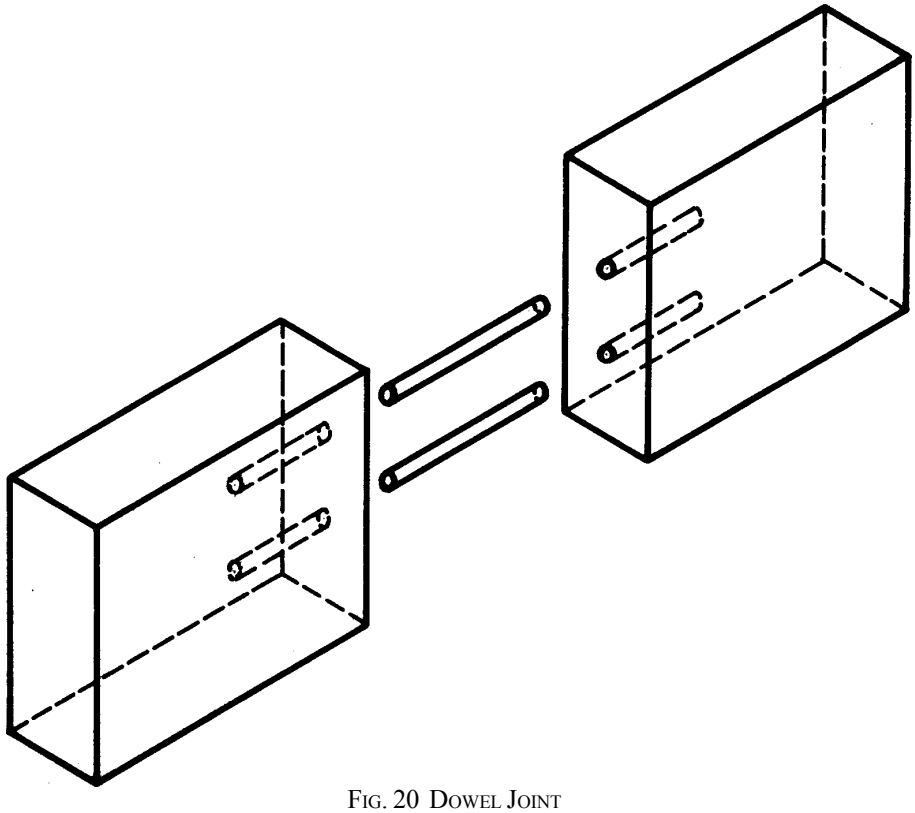


FIG. 20 DOWEL JOINT

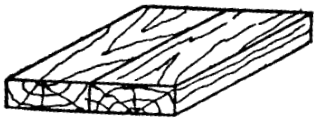


FIG. 21 EDGE JOINT

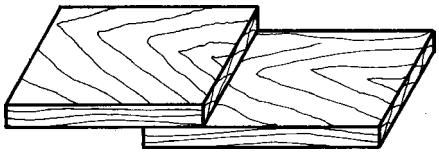


FIG. 22 LAP JOINT

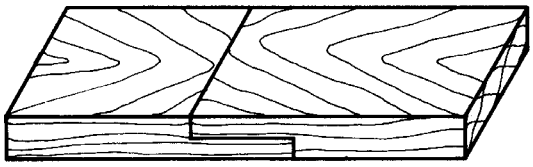


FIG. 23 HALVED JOINT

FIG. 24 SCARF JOINT

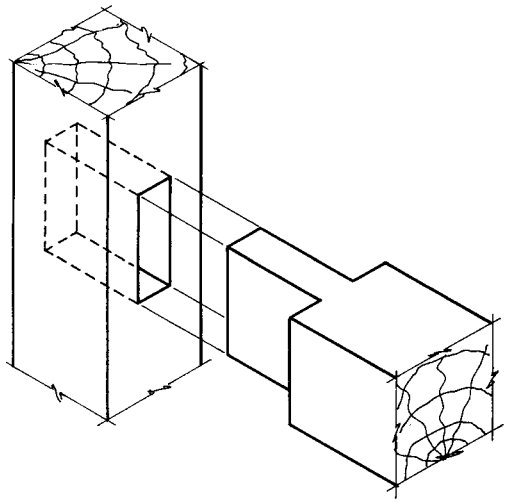


FIG. 25 MORTISE AND TENON JOINT

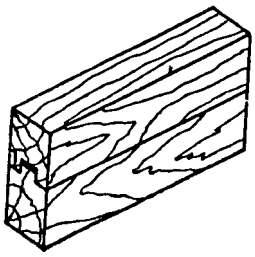


FIG. 26 TONGUE AND GROOVE JOINT

**3.263 Jointing** — Process of accurately setting cutters. Effect of jointing is to make the cutters share equally in the work, and for a specified finish.

**3.264 Joist** — A beam directly supporting floor, ceiling or roof of a structure.

**3.265 Jungle Wood** — A loose term used for miscellaneous unclassified timbers.

NOTE — The use of this term is deprecated.

**3.266 Juvenile Wood** — The wood formed near the pith, characterized by progressive changes in characteristics and dimensions of cells and patterns of cell arrangement. Syn. 'Crown-formed wood', 'Core wood'.

**3.267 Kadi** — A trade term to denote scantlings of odd sizes generally used as roof timbers.

**3.268 Kerf** — Width of the cut made by any type of saw.

**3.269 Kerf Loss** — Loss of timber during sawing in the form of saw dust due to saw cut.

**3.270 Kiln** — A chamber in which temperature, humidity and circulation of air may be controlled for seasoning timber.

**3.271 Kiln Seasoning** — The process of seasoning timber in a kiln. Syn. 'Kiln- Drying'.

**3.272 Knob** — A hard rounded protuberance on the surface of the log.

**3.273 Knobbly** — A log is said to be knobbly when a mass of small size knots is present on the surface.

**3.274 Knot** — A branch base or limb embedded in the tree or timber by natural growth (*see* Fig. 27).

FIG. 27 KNOT

**3.274.1** *Knots Classified According to Size*

**3.274.1.1** *Large knot* — A knot more than 40 mm in diameter.

**3.274.1.2** *Medium knot* — A knot more than 20 mm but not more than 40 mm in diameter.

**3.274.1.3** *Pin knot* — A knot not more than 6.5 mm in diameter.

**3.274.1.4** *Small knot* — A knot more than 6.5 mm but not more than 20 mm in diameter.

**3.274.2** *Knots Classified According to Quality*

**3.274.2.1** *Blind knot* — A large occluded knot that leaves a pronounce local swelling on the bole.

**3.274.2.2** *Branch knot* — Two or more knots branching from common axis.

**3.274.2.3** *Dead knot* — A knot in which the layers of annual growth are not completely intergrown with those of the adjacent wood. It is surrounded by pith or bark. The encasement may be partial or complete. Syn. 'Encased Knot' and 'Black Knot'. Cf. 'Live Knot'.

**3.274.2.4** *Enclosed knot* — A knot that does not appear on the surface of the timber.

**3.274.2.5** *Hollow knot* — See **3.274.2.8**.

**3.274.2.6** *Live knot* — A knot free from decay and other defects, in which the fibres are firmly intergrown with those of the surrounding wood. Syn. 'Intergrown Knot'. Cf. 'Dead Knot'. See also **3.274.2.10**.

**3.274.2.7** *Loose knot* — A knot that is not held firmly in place by growth or position, and that cannot be relied upon to remain in place. Cf. 'Tight Knot'.

**3.274.2.8** *Pith knot* — An otherwise sound knot with a pith hole. American usage reserves this for torn holes less than 6.0 cm in diameter.

**3.274.2.9** *Punk knot* — An unsound knot containing much fungus-infected tissue. Syn. 'Decayed Knot'. See also **3.274.2.12**.

**3.274.2.10** *Sound knot* — A tight knot free from decay, which is solid across its face, and at least as hard as the surrounding wood.

**3.274.2.11** *Tight knot* — A knot so held by growth or position as to remain firm in position in the piece. Cf. 'Loose Knot'.

**3.274.2.12** *Unsound knot* — A knot which is not solid across its face or which, as a result of decay, is not as hard as the surrounding wood. If the decay is advanced, there may be a hole in the centre with decay on the sides of the hole. Cf. 'Sound Knot'. See also **3.274.2.9**.

**3.274.3** *Knots Classified According to Form or Shape*

**3.274.3.1** *Oval knot* — A knot with one axis longer than the other due to cutting obliquely to the

lengthwise direction of the branch. Cf. 'Round Knot' and 'Splay Knot'.

**3.274.3.2** *Round knot* — A knot revealed in a section cut approximately at right angles to its axis and so appearing round. Cf. 'Splay Knot' and 'Oval Knot'.

**3.274.3.3** *Splay knot* — A knot revealed in a section cut approximately parallel to its axis and so having an elongated shape. Syn. 'Horn knot', 'Spike Knot', 'Mule-ear Knot (*see* note)' and 'Slash Knot (*see* Note)'. Cf. 'Round Knot' and 'Oval Knot'.

NOTE — The use of this term is deprecated.

**3.274.4** *Diameter of Knot* — The maximum distance between two points farthest apart on the periphery of a round knot, on the face on which it becomes visible. In the case of a spike or splay knot, the maximum width of the knot visible on the face on which it appears shall be taken as its diameter.

**3.275 Laminate** — A product made by bonding two or more layers (Laminae) of material or materials.

**3.276 Laminated Wood** — An assembled product made up of layers of wood and adhesive in which the grains of adjacent layers are parallel.

**3.277 Laminated Veneer Lumber (LVL)** — A structural composite made by laminating veneers 1.5 to 4.2 mm thick, with suitable adhesive and with the grain of veneers in successive layers aligned along the longitudinal (length) dimension of the composite.

**3.278 Lamin Board** — A board having a core of strips, each not exceeding 7 mm in thickness, glued together face to face to form a slab which in turn is glued between two or more outer veneers, with the direction of the grain of the core strips running at right angles to that of the adjacent outer veneers (*see* Fig. 28).

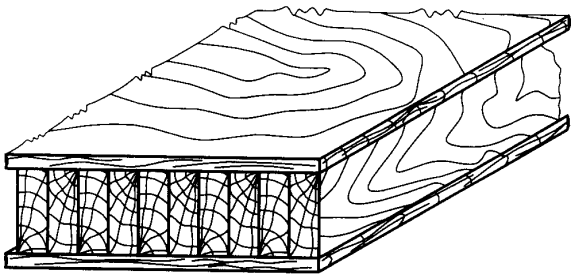


FIG. 28 LAMIN BOARD

**3.279 Latewood** — The portion of the wood that is formed in the later part of growth season and consists of thicker walled cells.

**3.280 Length of Internode** — Distance between adjacent nodes of a bamboo culm.

**3.281 Lignin** — A polymer of phenyl propane units, in its simple form ($C_6H_5CH_3CH_2CH_3$).

**3.282 Live Timber** — Timber cut from a tree which was standing and living at the time of cutting.

**3.283 Loaded End or Compression End Distance** — The distance measured from the centre of the fastener to the end towards which the load induced by the fastener acts.

**3.284 Location** — Location is generally referred to as the exact place where a timber or bamboo is used in building.

**3.284.1** *Inside Location* — Position in buildings in which timber or bamboo remains continuously dry or protected from weather.

**3.284.2** *Outside Location* — Position in buildings in which timbers or bamboos are occasionally subjected to wetting and drying as in the case of open sheds and outdoor exposed structures.

**3.284.3** *Wet Location* — Position in buildings in which timbers or bamboos are almost continuously damp or wet or in contact with earth or water, such as piles and timber/bamboo foundations.

**3.285 Log** — A log is the trunk of a tree that is felled and prepared for conversion.

**3.285.1** *Saw Logs* — Logs, whether or not roughly squared, for processing into sawn wood.

**3.285.2** *Veneer Logs* — Logs, whether or not roughly squared, for processing into veneer sheets.

**3.286 Lopping** — Cutting off small branches, twigs and rarely top of a standing tree.

**3.287 Lumber** — Converted timber.

**3.288 Machine Burn** — It is evidenced by the dark charred patches on machined wood and is due to heating of the cutting tools.

**3.289 Marine Plywood** — A plywood used in the construction, repair and maintenance of marine and river craft and capable of withstanding rigorous conditions involving changes in temperature, humidity and alternate wetting and drying.

**3.290 Mat** — A woven sheet made using thin slivers.

**3.291 Matchet** — A light cutting and slashing tool in the form of a large knife.

**3.292 Mature Wood** — Wood characterized by relatively constant cell size, well developed structural patterns, and stable physical behaviour. Syn. 'Adult Wood'.

**3.293 Medium Density Coirboard** — A panel product manufactured from coir and jute fibres

combined with synthetic resin or other suitable binder. These panels are manufactured to a specific gravity of 0.5 to 0.9 by the application of heat and pressure by a process in which the inter fibre bond is substantially created by the added binder.

**3.294 Medium Density Fibreboard** — A panel product manufactured from lignocellulosic fibres combined with synthetic resin or other suitable binder. The panels are manufactured to a specific gravity of 0.6 to 0.9 by the application of heat and pressure by a process in which the inter fibre bond is substantially created by the added binder.

**3.294.1** *Medium Density Fibreboard (MDF), Dry Process* — Dry process fibreboard, with density around 0.7 g/cm$^3$. The chips are grinded into fibre under steam pressure before the addition of resin. The resulting homogeneity of texture gives MDF desirable qualities as regards machining.

**3.294.2** *Medium Density Fibreboard (MDF), Wet Process* — Wet process fibreboard with a density usually greater than 0.35 g/cm$^3$ but not more than 0.8 g/cm$^3$. Most frequently, the density is in the upper part of the range.

**3.295 Medulla** — See **3.340**.

**3.296 Meristem** — A tissue capable of active cell division, thereby adding new cells to the plant body.

**3.297 Metal Clips and Staples** — Fasteners used in the assembly of plywood to prevent movement of the veneers during processing. These are removed from the finished product.

**3.298 Microfibril** — A thread like component of the fibrils of the cell wall, from 10 to 40 nm in diameter, visible under an electron microscope; believed to be composed of chain molecules and cellulose extending through regions of parallelism and order (crystallites) and regions of non-parallelism and/or disorder (amorphous regions).

**3.299 Mineral Bonded Panels** — Panels manufactured from chips, particles, flakes etc. or wood or other lignocellulosic materials, bonded together with mineral binders other than cement, and chemical additives, for example gypsum board. These are wood or other lignocellulosic material based panels but different from cement bonded panels.

**3.300 Mineral Streak** — Whitish streaks due to the presence of starch or other minerals.

**3.301 Miscut Timber** — The timber which is not cut straight or correct to the dimensions as required, or shows variation greater than permissible, is called miscut timber.

**3.302 Modulus of Elasticity in Bending** — Stiffness of the timber calculated from bending tests.

**3.303 Modulus of Rupture** — The maximum bending stress to failure determined from static bending tests.

**3.304 Moisture Content** — The mass of water present in wood or other material expressed as a percentage of its oven-dry mass.

**3.305 Moisture Gradient** — A gradation in the moisture content in successive layers of wood.

**3.306 Mortise** — A hole or slot to receive a tenon or dowel of corresponding size.

**3.307 Mould** — A soft vegetative growth of a fungus that forms on wood in damp, stagnant atmosphere. It is the least harmful type of fungus, usually confined to the surface of the wood.

**3.308 Moulding** — Shaping timber to a required outline or contour.

**3.309 Multi-layer Particle Board** — A board made of several layers of like material in which particles of different shapes and sizes may be used in different layers.

**3.310 Multiply** — Plywood panel made of more than three layers of veneer.

**3.311 Napha** — A groove cut along the periphery and near one end of the log for the purpose of dragging by use of rope or chain.

**3.312 Narrow-Ringed** — Applied to timber with relatively narrow growth rings. Syn. 'Slow Grown', 'Close Grown' and 'Fine Grown'. Cf.' Wide-Ringed'.

**3.313 Natural Grown Trees** — Trees grown in a forest either out of coppice or out of seeds under natural forest conditions.

**3.314 Net Section** — Section obtained by deducting from the gross cross-section, the projected areas of all materials removed by boring, grooving or other means.

**3.315 Node** — The place in a bamboo culm where branches sprout and a diaphragm is inside the culm and the walls on both sides of node are thicker.

**3.316 Non-decorative Veneers** — Veneers, usually peeled, without specific decorative characteristics. They are often used for the cores of plywood.

**3.317 Non-porous Wood** — See **3.503.1**.

**3.318 Normal Incidence Sound Absorption Coefficient** — It is the fraction of normally incident sound energy absorbed by the timber. The sound absorption coefficient of timber is the characteristic

of the material and depends on the frequency of sound, angle of incidence, the surface quality of the material, and the moisture content.

**3.319 Off- Road Transportation** — Transport of timber in the form of logs or scants from the stump site to the points of loading on trucks for on-road transportation or launching in river is termed as off-road transportation. It is also called as terrain transportation or minor transportation.

**3.320 Open Assembly Time** — The time elapsing between the application of the adhesive and assembly of the joint components.

**3.321 Open Defect** — A defect in the plywood, natural or otherwise, which causes a hole or gap in a ply. In solid timber the term is applicable to any defect that can be seen with the naked eye.

**3.322 Oriented Strand Board** — Special type of platen pressed board, wherein the strands are all oriented in the same direction, thereby improving the strength characteristics of the board, in the direction in which the strands are oriented.

**3.323 Outer Diameter** — Diameter of a cross-section of a piece of bamboo measured from two opposite points on the outer surface.

**3.324 Oval Log** — A log is oval when the least diameter at either end is less than 80 percent of the greatest diameter at the same end.

**3.325 Overlap** — A ridge-like elevation noticeable on the surface due to overlapping of two adjacent core veneers.

**3.326 Overlay Paper** — A highly absorbent tissue paper having a weight of 18-40 g/m$^2$.

**3.327 Oven-Dry/Oven Dried Timber** — The condition of timber or panel dried in an oven at 103 ±2°C until its mass becomes constant.

**3.328 Parenchyma** — Tissues composed of thin-walled cells that are typically brick shaped or isodiametric and have simple pits formed in wood from (a) fusiform cambial initials by later transverse division of the daughter cells (axial parenchyma), or (b) ray initials (ray or radial parenchyma). Syn. 'Soft Tissue' and 'Storage Tissue'.

NOTE — It primarily concerns with the storage and distribution of food materials. It is termed as 'Wood Parenchyma' or 'Xylem Parenchyma' if occurring in the xylem, and 'Phloem Parenchyma' if in the phloem.

**3.328.1** *Aliform Parenchyma* — Paratracheal parenchyma with wing-like lateral extensions as seen in cross section.

**3.328.2** *Apotracheal Parenchyma* — Axial parenchyma typically independent of pores or vessels. See also **3.328.4**, **3.328.7** and **3.328.14**.

**3.328.3** *Axial Parenchyma* — Parenchyma cells derived from the fusiform cambial initials. Cf. 'Ray Parenchyma'.

**3.328.4** *Banded Parenchyma* — Axial parenchyma forming concentric lines or bands as seen in cross section.

NOTE — It is termed as 'Apotracheal Banded' if typically independent of the vessels and 'Paratracheal Banded', if associated with the vessels.

**3.328.5** *Confluent Parenchyma* — Coalesced aliform parenchyma forming irregular tangential or diagonal bands as seen in cross-section.

**3.328.6** *Diffuse-in-Aggregates Parenchyma* — Apotracheal parenchyma cells that tend to be grouped in short tangential lines from ray as seen in cross section. Syn. 'Diffuse-Zonate'.

NOTE — This type often occurs together with reticulate parenchyma.

**3.328.7** *Diffuse Parenchyma* — Single apotracheal parenchyma strands or cell distributed irregularly among fibres as seen in cross-section.

**3.328.8** *Initial Parenchyma* — Apotracheal parenchyma, the cells of which occur either singly or in more or less continuous layer of variable width at the beginning of a season's growth. Cf. 'Terminal Parenchyma'.

**3.328.9** *Paratracheal Parenchyma* — Axial parenchyma associated with the vessels or vascular tracheids.

NOTE — This includes scanty paratracheal, vasicentric, aliform and confluent parenchymas.

**3.328.10** *Ray Parenchyma* — Parenchyma composing of rays wholly or in part. Syn. 'Radial Parenchyma'.

**3.328.11** *Reticulate Parenchyma* — A descriptive term for the net-like pattern formed on the cross-section by rays and regularly spaced bands or lines of axial parenchyma, when the bands or lines and the rays are of about the same width and are same distance apart. Cf. 'Scalariform Parenchyma'.

**3.328.12** *Scalariform Parenchyma* — A descriptive term for the ladder-like pattern formed on the cross-section by rays and regularly spaced bands or lines of axial parenchyma when the latter are distinctly narrower than the rays. Cf. 'Reticulate Parenchyma'

**3.328.13** *Scanty Paratracheal Parenchyma* — Incomplete sheaths of occasional parenchyma cells around the vessels.

**3.328.14** *Terminal Parenchyma* — Apotracheal parenchyma cells occurring either singly or forming

a more or less continuous layer of variable width at the close of a season's growth.

NOTE — Before a distinction was made between terminal and initial parenchyma this term was used to include both forms and is still used in this sense as a term of convenience.

**3.328.15** *Vasicentric Parenchyma* — Paratracheal parenchyma forming a complete sheath around a vessel of variable width and circular or slightly oval in cross-section.

**3.329 Particle** — Distinct particle or fraction of wood or other lignocellulose material produced mechanically for use as the aggregate for a particle board. This may be in the form of flake, granule, shaving, splinter and sliver.

**3.329.1** *Flake* — Specially made thin flat particles, with the grain of the wood essentially parallel to the surface of the flake, prepared with the cutting action of the knife in a plane parallel to the grain but at an angle to the axis of the fibre.

**3.329.2** *Granule* — A particle in which the length, width and thickness are approximately equal, such as particles of saw dust.

**3.329.3** *Shaving* — A thin slice or strip of wood or any other lignocellulose material pared off with knife, plane or other cutting instrument, the knife action being approximately along the axis of the fibre, such as the shavings produced in planing the surface of wood.

**3.329.4** *Splinter and Sliver*

**3.329.4.1** *Splinter and sliver, for wood* — Particle of nearly square or rectangular cross section with a length parallel to the grain of the wood of at least four times the thickness.

**3.329.4.2** *Splinter and sliver, for bamboo* — Thin strips of bamboo processed from bamboo culm.

**3.330 Particle Board** — A board manufactured from particles of wood or other lignocellulose material, for example, flakes, granules, shavings and slivers or splinters, agglomerated, formed and pressed together by use of an organic binder together with one or more of the agents, such as heat, pressure, moisture and a catalyst.

**3.330.1** *Classification Based on Density*

**3.330.1.1** *Low density particle boards* — Particle boards having specific gravity not exceeding 0.4.

**3.330.1.2** *Medium density particle boards* — Particle boards having specific gravity of 0.5 to 0.9.

**3.330.1.3** *High density particle boards* — Particle boards having specific gravity over 0.9.

**3.331 Particle Board of Ligno-cellulosic Material other than Wood** — Particle board of bagasse, flex, hemp, straw or other non-wood ligno-cellulosic materials.

**3.331.1** *Bagasse Board* — Particle board of bagasse.

**3.331.2** *Flax Board* — Particle board of flax shives.

**3.331.3** *Other Non-wood Particle Board* — Particle board of non-wood ligno-cellulosic materials other than bagasses or flax shives, such as hemp or straw.

**3.332 Patch** — A piece of sound veneer placed in and glued to a veneer from which the defective portion has been removed.

**3.333 Permissible Stress** — Stress obtained after applying factor of safety to the ultimate or basic stress.

**3.334 Phloem** — The principal food-conducting tissue of the vascular plants. It occurs both as primary and secondary tissue and is usually, but not invariably, associated with xylem. In the stems of most gymnosperms and dicotyledons the secondary phloem is separated from the secondary xylem from the cambium from which it is derived. The basic types of cells of which it is composed are sieve elements, parenchyma cells, fibres and sclereides.

**3.335 Pile** — A structural member inserted into the ground, which transmits a vertical load or lateral load to the subsoil through friction or end bearing or a combination of both.

**3.336 Pit** — A recess in the secondary wall of a cell, together with its external closing membrane; open internally to the lumen.

NOTE — Essential components of pit are the pit cavity and the pit membrane.

**3.337 Pitch Pocket** — Accumulation of resin between growth rings of coniferous wood as seen on the cross-section.

**3.338 Pitch Seam** — An opening along the grain following the growth rings and containing resin.

**3.339 Pitch Streak** — See **3.338**.

**3.340 Pith** — The soft tissues found near about the centre of the log, also called central core of the tree (*see* Fig. 1).

**3.341 Pith Flecks** — Irregular patches of soft tissues formed in the wood as a result of injury by insects.

**3.342 Plain Sawn Timber** — Wood so sawn that the tangential face is exposed on the surface of the plank.

**3.343 Plank** — A piece of sawn timber whose thickness does not exceed 5 cm but the width exceeds 5 cm.

**3.344 Plantation Grown Trees** — Trees raised in a plantation from cuttings or seedlings originally taken out from a nursery or from direct sowing of seeds.

**3.345 Plate** — A horizontal member supported throughout its length and provided for the purpose of distributing the load on a member.

**3.346 Platen Pressed Particle Board** — Particle board made from particles of wood, bonded with synthetic resin and/or other usually organic, binder and pressed in a platen press.

**3.346.1** *Oriented Particle Board* — Special type of platen pressed particle board, wherein the particles are all oriented in the same direction, thereby improving the strength characteristics of the board, in the direction in which the particles are oriented.

**3.346.2** *Wafer Board* — Special type of platen pressed particle board, made up of long particles 'wafers' thereby the strength characteristics of the board.

**3.346.3** *Other Platen Pressed Particle Board* — Platen pressed particle board other than oriented board and wafer board. The majority of platen pressed particle board comes under this heading.

**3.347 Pleat** — A defect due to a veneer being folded parallel to the grain forming three thicknesses locally.

**3.348 Ply** — The individual layer of veneer forming the plywood.

**3.349 Plywood** — A panel formed of three or more layers of veneer glued together, usually with the grain of adjacent veneers running at right angles to each other.

**3.350 Pocket Rot** — A decay limited to pockets or small areas surrounded by apparently sound wood.

**3.351 Pole** — Round log used as support for communication lines, power lines and for hop growing.

**3.352 Polyvinyl Acetal Resin** — Resin derived from the reaction of polyvinyl alcohol with formaldehyde or butyraldehyde.

**3.353 Pore** — A term of convenience for the cross-section of a vessel or of vascular tracheid.

NOTE — The pores are often visible on the end surface of hardwoods as small, round holes.

**3.353.1** *Pore-Chain* — A series or line of adjacent solitary pores.

**3.353.2** *Pore-Cluster* — See Note under **3.353.3**.

**3.353.3** *Pore-Multiple* — A group of two or more pores crowded together and flattened along the lines of contact so as to appear as subdivisions of a single pore.

NOTE — The most common type is a 'Radial Pore-Multiple', in which the pores are in radial series with flattened tangential wall between them. Another type is 'Pore Cluster', in which the grouping is irregular.

**3.353.4** *Solitary Pore* — A pore completely surrounded by other elements.

**3.354 Porous Wood** — See **3.503.2**.

**3.355 Post** — A general term for timber used in an upright position in building, fencing or other structural work.

**3.356 Pot Life** — The time between the mixing of the constituent parts of an adhesive and its reaching the age when it is no longer usable.

**3.357 Prelaminated Medium Density Fibreboard** — A medium density fibreboard laminated on both surfaces by synthetic resin impregnated base papers with or without impregnated overlay under the influence of heat and pressure.

**3.358 Prelaminated Particle Board** — A particle board laminated on both surfaces by synthetic resin impregnated base papers under the influence of heat and pressure or with finished foils under the influence of pressure or pressure and heat depending upon the type of binder used.

**3.359 Preservation** — Treatment of timber with chemicals so as to enhance its durability.

**3.360 Preservative** — A substance when suitably applied to the timber or plywood makes it resistant to attack by fungi, termite and other insects or marine borers.

**3.361 Primer** — An undercoat given on the surface for subsequent painting where required.

**3.362 Principal Rafter** — A roof member which supports purlins.

**3.363 Pulp (Wood, Other Fibrous Lignocellulosic Materials or of Waste Paper)** — Wood, other fibrous lignocellulosic materials or waste paper broken down into fibres by mechanical or chemical means, so as to be suitable as raw material for the manufacture of paper, paperboard or the products of dissolving pulp. It includes knot pulp, reject pulp and fluff pulp.

**3.363.1** *Mechanical and Chemi-mechanical Wood Pulp* — Wood pulp obtained by grinding or milling into their fibres, coniferous or non-coniferous rounds, quarters, billets, etc, or through refining coniferous or non-coniferous chips. Also called stone groundwood pulp and refiner pulp. The billets or

chips can be pre-treated with a suitable chemical to produce chemi-mechanical pulp. For this pulp, the ratio of the weight of the pulp produced to the weight of wood used is often very high. The pulp may be unbleached or bleached.

**3.363.1.1** *Unbleached pulp* — Pulp not treated with chemicals to increase its brightness.

**3.363.1.2** *Bleached pulp* — Pulp treated with chemicals to increase its brightness.

**3.363.2** *Thermo-mechanical Wood Pulp* — Wood pulp produced by a mechanical process in which coniferous or non-coniferous wood particles are softened by pre-heating under pressure prior to a pressurized refining stage. It may be unbleached or bleached.

**3.363.3** *Semi-chemical Wood Pulp* — Wood pulp obtained by mechanically reducing coniferous or non-coniferous wood to small pieces, which are cooked in a pressure vessel with a suitable chemical, but not sufficiently for the fibres to separate readily, followed by mechanical treatment. The ratio of the weight of the pulp produced to the weight of wood used is often very high. It may be unbleached or bleached.

**3.363.4** *Sulphate and Soda Pulp, except Dissolving Grades* — Wood pulp obtained by mechanically reducing coniferous or non-coniferous wood to chips which are subsequently cooked in a pressure vessel in the presence of sodium hydroxide cooking liquor (soda pulp) or a mixture of sodium hydroxide and sodium sulphide cooking liquor (sulphate pulp). It may be unbleached, partly bleached or bleached. The term 'Kraft' is frequently used to describe pulp made by the sulphate process.

**3.363.5** *Sulphite Wood Pulp, Except Dissolving Grades* — Wood pulp obtained by mechanically reducing coniferous or non-coniferous wood to chips which are subsequently cooked in a pressure vessel in the presence of bisulphite cooking liquor. Bisulphites such as ammonium calcium, magnesium, and sodium are commonly used. It may be unbleached, partly bleached or bleached.

**3.363.6** *Dissolving Pulp* — Highly bleached chemical pulp (sulphate, soda or sulphite) obtained from coniferous or non-coniferous wood, rags, cotton linters, etc, of special quality with a very high alpha-cellulose content (usually 90 percent and over), readily adaptable for uses other than paper making. These pulps are always bleached. They are used principally as a source of cellulose in the manufacture of products such as man-made fibres, cellulosic plastic materials, lacquers, explosives, etc.

**3.363.6.1** *Dissolving pulp from wood* — Dissolving pulp obtained from coniferous or non-coniferous wood.

**3.363.6.2** *Dissolving pulp, from wood, sulphate and soda* — Dissolving grade wood pulp obtained by use of the sulphate and soda process.

**3.363.6.3** *Dissolving pulp, from wood, sulphite* — Dissolving grade wood pulp obtained by use of the sulphite process.

**3.363.6.4** *Dissolving pulp from other fibrous lignocellulosic materials* — Dissolving pulp obtained from rags, cotton linters, bamboo, etc.

**3.363.7** *Pulp except Dissolving Grades from Fibrous Lignocellulosic Materials Other than Wood* — Includes pulp, except dissolving grades, obtained by any method from fibrous ligno-cellulosic materials, except wood. It may be unbleached or bleached.

**3.363.7.1** *Straw pulp* — Pulp made from straw.

**3.363.7.2** *Bagasse pulp* — Pulp made from bagasse.

**3.363.7.3** *Bamboo pulp* — Pulp made from bamboo.

**3.364 Purlins** — A roof member directly supporting roof covering or common rafter and roof battens.

**3.365 Putty** — Pasty material used to repair the cracks, splits or holes in the plywood or wood based panels which sets on application on the panels.

**3.366 Quarter-Sawn Timber** — Wood so sawn that the radial face is exposed on the surface of plank.

**3.367 Rabbet** — See **3.374**.

**3.368 Radial Sawn Timber** — See **3.366**.

**3.369 Rails** — Horizontal members of shutters of doors, windows, panels or fencing.

**3.369.1** *Fence Rails* — Horizontal members in a fence to ensure a predesigned protection which the fence is expected to serve.

**3.370 Random Sample** — A sample drawn from a population of the individual units of which property is required, drawn in such a way that the selection of the specimen has no influence on the property to be evaluated.

**3.371 Rating Factor** — A figure indicative of performance characteristics of timber under different wood working operations. It is taken as the total number of specimens of acceptable grade expressed as percentage of the total number of specimens subjected to that particular test.

**3.372 Ray** — A ribbon-like aggregate of cells extending radially in the xylem and phloem.

NOTE — The terms 'Medullary Ray' and 'Pith Ray' are now restricted to the parenchyma connecting the primary cortex with the pith.

**3.373 Reasonably Straight Bamboo** — Bamboo out of straight by not more than one diameter.

**3.374 Rebate** — A recess along the edge of a piece of timber to receive another piece or a door, sash or frame.

**3.375 Reconditioning** — A high temperature steaming treatment designed to remove collapse and excessive warp.

**3.376 Recovery** — The quantity of converted timber of specified quality obtained from a piece, expressed as a percentage of its volume, calculated according to conventional practices.

**3.377 Reeper** — Batten used in roof construction.

**3.378 Resin Canals** — Special tubular cavities which contain gum or resin. A term mostly used in the case of non-porous timber.

**3.379 Resin Pockets** — See **3.337**.

**3.380 Resin Streaks** — See **3.338**.

**3.381 Ring Porous Wood** — Wood in which the pores of early wood are distinctly larger than those of the latewood and form a well-defined zone or ring (*see* Fig. 29).

**3.382 Ripping** — Sawing timber lengthwise along the grain.

**3.383 Ripple Marks** — Fine horizontal striations visible on the tangential longitudinal surfaces of certain woods, due to the storied arrangement of the rays or of the axial elements or of both.

**3.384 Roof Battens** — A roof member directly supporting tiles, corrugated sheets, slates or other roofing material.

**3.385 Roof Skeleton** — The skeleton consisting of bamboo truss or rafter over which solid bamboo purlins are laid and lashed to the rafter or top chord of a truss by means of galvanized iron wire, cane, grass, bamboo leaves, etc.

**3.386 Rot** — See **3.134**.

**3.387 Round Timber** — Timber in the original round form.

**3.388 Ruptured Grain** — See **3.218.35** and **3.478**.

**3.389 Sap Rot** — Zones of sapwood with or without reduction of hardness, characterized by abnormal colouration resembling the texture of marble, appearing in felled timber under the action of wood-destroying fungi. They can appear in the heart.

**3.390 Sap Stain** — Discolouration of the sapwood mainly due to fungi.

**3.391 Sapwood** — The outer layers of the log, which in the growing tree contain living cells and food material. The sapwood is usually lighter in colour and is readily attacked by insects and fungi (*see* Fig. 1).

**3.391.1** *Included Sapwood* — Wood included in the heartwood, having the appearance and properties of sapwood. Living cells are no longer present as in

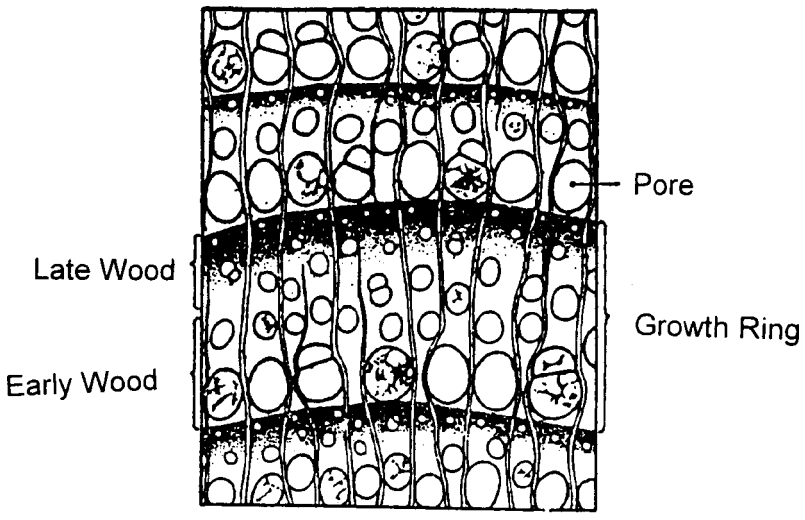



FIG. 29 RING-POROUS WOOD

normal sapwood but reserve materials may remain. Syn. 'Internal Sapwood'.

**3.392 Sawdust** — Wood dust produced in the process of sawing.

**3.393 Scantling** — A piece of timber whose cross-sectional dimensions exceed 5 cm but do not exceed 20 cm in both directions.

**3.394 Scar** — Depression in the surface of the bole, generally elliptical in shape, resulting from wounds where healing has not re-established the normal cross-section of the bole.

**3.395 Scoring** — Mechanical injury in the form of long scratches or shallow channels.

**3.396 Scribe** — To shape the abutting end of a member to the profile of another.

**3.397 Seasoned Timber** — Timber whose moisture content has been reduced to the specified minimum under more or less controlled processes of drying.

**3.398 Seasoning** — A process involving the reduction of moisture content in timber under more or less controlled conditions towards or to an amount suitable for the purpose for which it is to be used.

**3.399 Section of a Pole** — A piece of short length pole employed for making a full length jointed pole, also known as component.

**3.400 Set** — The amount of cut the teeth should be able to give clear of the body of the saw blade, so that there is freedom from friction between saw blade and timber. This is achieved either by bending over to right or left the cutting point of alternate tooth or by increasing the thickness of the cutting point of the teeth from the thickness of the saw blade. The former is called spring set while latter is called swage set. In India generally spring set is used.

**3.401 Setting Time** — The time taken for the putty to convert itself into a cohesive mass which meets the requirements after a specified time.

**3.402 Shake** — A partial or complete separation between adjoining layers of tissues as seen on the end surfaces (*see* Fig. 30).

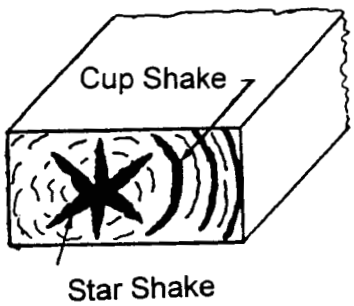



FIG. 30 SHAKE

**3.402.1** *Heart Shake* — Shakes occurring at or near the pith (centre heart).

**3.402.2** *Radial Shake* — A shake following the medullary rays.

**3.402.3** *Ring Shake or Cup Shake* — An opening along the growth ring.

**3.402.4** *Star Shake* — A number of shakes, occurring at or near the pith and giving the appearance of a star on the end of a piece.

**3.403 Shatter** — An injury suffered in falling.

**3.404 Sharpness Angle** — The angle between the front and the back of the saw teeth.

**3.405 Shelf Life** — The period for which the adhesive or adhesive components may be stored without affecting their suitability for use in accordance with the relevant standards.

**3.406 Shell** — The wall of the bamboo.

**3.407 Shingle** — A short, thin, rectangular piece of timber, usually tapering in thickness along the grain, used in the same way as tiles for covering the roofs and sides of buildings.

**3.408 Shooks** — A set of components of sawn timber (or plywood) of definite dimensions intended to form a box, chest or crate.

**3.409 Short Crook** — A localized deviation from straightness which, within any section of 1.5 m or less in length, is more than one half the mean diameter of the cooked section.

**3.410 Shrinkage** — The reduction in dimensions of timber which takes place during drying.

**3.411 Single-Layer Particle Board** — Particle board, either homogeneous or of graded density, made essentially of one kind of particle throughout its thickness.

**3.412 Site Quality** — A measure of the relative production capacity of a site for a particular species. The top height of the tree as it varies with the age is generally the basis for classification.

**3.413 Sizing Material** — Alum, wax, resin or other additive introduced to the agglomerate for a particle board/ medium density fibreboard/medium density coirboard, etc, prior to forming, primarily to increase water resistance.

**3.414 Skip** — In planing operation, slight depressions occurring below the line of cut and remaining is rough in unplaned condition; these are known as skips. (Syn. Skip-in-planing; Skip-in-surfacing). A series of skips is sometimes referred to as 'hit and miss'.

**3.415 Slab** — The exterior portion of a log or baulk which is removed by the saw in the process of converting it to a square-sawn timber.

**3.416 Slat** — A long, narrow thin strip of wood as used for crates, venetian blinds, cooling towers, pencils, etc.

**3.416.1** *Pencil Slat* — In pencil manufacture, a sawn piece of wood about 185 × 65 × 6 mm.

**3.417 Sleeper** — A piece of timber used as transverse support under rails in railway lines, usually square sawn.

NOTE — Sleepers are sometimes used for reconversion.

**3.418 Slenderness Ratio** — The ratio of the length of member to the radius of gyration is known as slenderness ratio of member (The length of the member is the equivalent length due to end conditions).

**3.419 Slope of Grain** — See **3.218.31**.

**3.420 Slot** — A slot made around one end of a log to prevent the drag chain or rope from slipping when the log is dragged.

**3.421 Slot Screwing** — A method of screwing which leaves the shank free to move in a slot to allow for expansion and contraction.

**3.422 Snout** — Pointed end of the log when felling and logging is done by axe.

**3.423 Snouting** — Rounding back of the whole of the front end edges of a log to ease skidding (Syn. snipping).

**3.424 Soft Tissue** — See **3.328**.

**3.425 Softwood** — A conventional term used to denote the timber from conifers and has no relationship with the physical properties of hardness or strength. On account of the confusion this term can cause, its use is discouraged.

**3.426 Sound Wood** — Wood free from insect hole, rot, loose knot, dote and sound knot exceeding 2 mm in diameter.

**3.427 Spacing Blocks** — Any block or wood strip fastened to the inside of the crate to hold the contents in position.

**3.428 Splints** — Undipped match sticks prior to application of chemical head.

**3.429 Split** — A separation of fibres which extends from one face of a piece of wood to another and runs along the grain of the piece.

**3.429.1** *Closed Spilt* — A split in which the two adjacent edges of the broken veneers are in close contact with each other.

**3.429.2** *End Spilt* — A split at the end of a log or a piece of timber or plywood.

**3.429.3** *Hair Split* — A very thin, short, superficial separation of fibres along the grain.

**3.429.4** *Open Split* — A split in which the adjacent edges are not in close contact with each other.

**3.430 Spread of Adhesive** — The area of surface covered by 0.5 kg of adhesive mix prepared in accordance with the manufacturer's instructions.

**3.431 Spring** — Edgewise deviation from a straight line drawn from end to end of a piece (*see* Fig. 31).

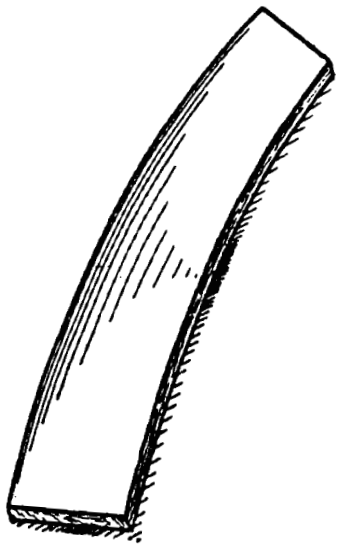


FIG. 31 SPRING

**3.432 Spring Wood** — The early wood in a growth ring, applicable only to timbers of temperate climate.

**3.433 Square** — Timber formed by slabbing a log on four sides.

**3.434 Stain** — Discolouration or variation from the natural colour due to chemical reaction, fungi or other cause.

**3.434.1** *Blue Stain* — A type of stain bluish in colour.

**3.435 Standard Clear Specimens** — Specimens with their size as per the corresponding test mentioned in IS 1708 (Parts 1 to 18) having straight grains and free from any defects which may influence the strength characteristics.

**3.436 Stave** — A piece of sawn or split timber of a definite dimension intended to form part of a barrel.

**3.437 Steam Bending** — Bending timber to the required shape with the help of steaming process.

**3.438 Stem Tightner** — A device consisting of a wire rope and lever mechanism for tensioning the wire rope. It is fixed just above the felling cut to avoid splitting of butt-end particularly in leaning trees and coniferous woods.

**3.439 Stile** — A vertical member of shutter frame.

**3.440 Straw Panels** — A compressed straw sheet made by pressing long parallel stalks of straw into a panel by stitching or covering the panel with paperboard.

**3.441 Streak** — The presence of foreign material in timber and includes black streak, gum strak, mineral streak, pitch streak and radial streak.

**3.442 Storeyed or Storied** — A term applied to the axial cells and rays in wood when these are arranged in horizontal series on tangential surfaces.

NOTE — The term may be applied to particular tissues, for example, 'storied parenchyma', or used in a general sense as in 'woods with storied structure'. The presence of storied structure is the cause of the ripple marks visible with the unaided eye.

**3.443 Strength Coefficient** — The numerical value for a timber species evaluated by taking into consideration relevant suitability indices for a particular end use expressed in terms of teak as 100.

**3.444 Stress Grading** — Often used synonymously with 'structural grading'. However, sometimes a small distinction is made between the two. Stress grading refers to the principle by which the material is graded by consideration of maximum principle stresses to which it can be subjected. 'Structural grading' refers to the principle by which the material is graded on the basis of visible defects which have known effects on the strength properties of the material.

**3.445 Structural Sandwich Construction** — A laminae construction comprising a combination of alternate dissimilar simple or composite materials assembled and intimately glued in rotation to each other so as to make use of the properties of each to attain specific structural advantage for the whole assembly.

**3.446 Structural Timber** — Timber used in framing and load bearing structure or timber used or intended for use in building where strength is the primary consideration.

**3.447 Strut** — A strut is an intermediate frame member parallel to a pair of edge members used to relieve those edge members of some of their load.

**3.448 Stump** — The basal portion of a tree left at site after felling the tree.

**3.449 Sub-grade** — Grade of the material Iower than the grade that is offered or certified.

**3.450 Suitability Coefficient** — A numerical value attached to a timber giving an idea about its suitability for particular purpose. Suitability coefficients are calculated from the physical and mechanical properties of the timber.

**3.451 Summerwood** — The latewood in a growth ring, applicable only to timbers of temperate climate.

**3.452 Super-Grade** — Grade of the material higher than the grade that is offered or certified.

**3.453 Surface Crack** — Shallow longitudinal separation of the fibres which does not extend beyond a depth of 9.5 mm.

**3.454 Swelling** — Increase in size of sawn timber due to the increase of its moisture content.

**3.455 Swirl** — See **3.190.17**.

**3.456 Synthetic Resin** — Amorphous organic materials produced by the polymerization or condensation of one, two or less frequently three relatively simple compounds. The term is also applied now-a-days to chemically modified natural resins. The properties of synthetic resins can vary widely depending upon their basic raw materials, proportions and conditions of manufacture. All synthetic resins are classified broadly as thermosetting or thermoplastic.

**3.456.1** *Phenolic Synthetic Resin* — A phenolic synthetic resin is derived from the reaction of phenol with an aldehyde.

**3.456.2** *Aminoplastic Synthetic Resin* — An aminoplastic synthetic resin is derived from the reaction of urea, thiourea, melamine or allied compounds or mixtures of these compounds with formaldehyde.

**3.457 Synthetic Resin Adhesive** — A composition, substantially consisting of a synthetic resin of either the phenolic or aminoplastic type including any hardening agent, fortifier, filler or extender, which may be required to be added before use according to the manufacturer's instructions.

**3.458 Tally** — The sizes and number of individual pieces of a particular consignment.

**3.459 Tape** — Strip of gummed paper or similar material used to hold together the edges of a joint or split during manufacture.

**3.460 Taper** — Progressive diminution in girth along the length from the butt end to the top.

**3.461 Tapping Mark** — Dark brown marks due to

wounds resulting from tapping, nailing and physiological reasons. Loose ingrown bark which will split during processing will not come under this.

**3.462 Tenon** — A tongue like projection on the end of a piece of timber to fit into a corresponding mortise.

**3.463 Tension Wood** — Abnormal wood formed on the upper side of branches and inclined stems of broad-leaved trees, characterized by gelatinous fibres.

**3.464 Test Area** — A particular compartment/block of forest area selected for getting the timber trees for testing.

**3.465 Testing Authority** — The organization which is responsible for testing timber and presenting its data in accordance with the standard procedures.

**3.466 Texture** — Term to indicate relative size and distribution of wood elements.

**3.466.1** *Coarse Texture* — Indicates large size or wide distribution or both of wood elements.

**3.466.2** *Even Texture* — Indicates little variation in size and distribution of wood elements. Syn. 'Even Grain' (*see* Note).

NOTE — The use of this term is deprecated.

**3.466.3** *Fine Texture* — Indicates small size or close distribution or both of wood elements.

**3.466.4** *Uneven Texture* — Indicates variability of sizes and distribution of wood elements. Syn. 'Uneven Grain' (*see* Note).

NOTE — The use of this term is deprecated.

**3.467 Thermal Conductivity** — It is defined as the quantity of heat which flows in one second across unit are of a slab of timber of unit thickness when the temperature of the faces of the slab differs by one degree. In SI units it is expressed in watt per metre Kelvin (W/mK).

**3.468 Thin Particle Board (Continuous Calendar Process)** — Thin particle board (usually less than 6 mm), produced by a continuous process, where a calendar roll replaces the platen press. There is a large proportion of small particles in the furnish.

**3.469 Three-Layer Particle Board** — A particle board made of three layers of particles and resin mix, usually with finer and thinner particles for the top and bottom layers and coarser and bigger particles for the core layer. A three-layer board may consist of core of one species and the outer layers of another species. Resin content in a three-layer board is usually higher in the face layers than in the core layer leading to a sandwich construction with stronger and denser skin.

**3.470 Three-Ply** — Plywood panel made from three layers of veneer.

**3.471 Three-Way-Corner** — A corner formed by three edge members so arranged that each member is nailed into the side grain of another member and has the third member nailed to it in the same way. All nails are thus driven into the side grain of the timber.

**3.472 Ties** — An American term for railway sleepers.

**3.473 Timber** — A commercial wood, often in converted form.

**3.474 Timber Ton** — A volumetric measure equivalent to 1.42 $m^3$ of timber.

**3.475 Tissue** — Group of cells, which in higher plants consist of (a) Parenchyma – a soft cell of higher plants as found in stem pith or fruit pulp, and (b) Epidermis – the outermost layer of cells covering the surface of a plant, when there are several layers of tissue.

**3.476 Tooth Pitch** — The distance between the two consecutive saw teeth.

**3.477 Top End of Bamboo** — The tapered end (thin end) of bamboo where the shell thickness is lesser than the other end.

**3.478 Torn Grain** — A rupture and lifting of the surface grain of the wood resulting in rough surface. (*see also* **3.218.35**).

**3.479 Tracheid** — An imperforate wood cell with bordered pits to congeneric elements.

**3.480 Tree Biomass** — Refers to the tops, small branches, twigs, stumps, roots, needles, leaves and bark removed in the forest.

NOTE — These assortments are sometimes referred to as 'logging residues' or harvesting residues.

**3.481 Trunk** — The stem of a tree.

**3.482 Twist** — Spiral distortion of the piece lengthwise (*see* Fig. 32).

**3.483 Tyloses** — An outgrowth from an adjacent ray or axial parenchyma cell through a pit cavity in a vessel wall partially or completely blocking the vessel lumen.

NOTE — Tyloses may be a few or many crowded together, thin or thick walled, pitted or unpitted, with or without starch, crystals, resins, gums, etc.

**3.484 Underwood** — Bushes or small trees growing under timber trees.

**3.485 Units of Defects** — It is a quantitative representation of the approximate degrade of the utilizable material for each defect. A sum of units of various defects gives a total estimate of the entire

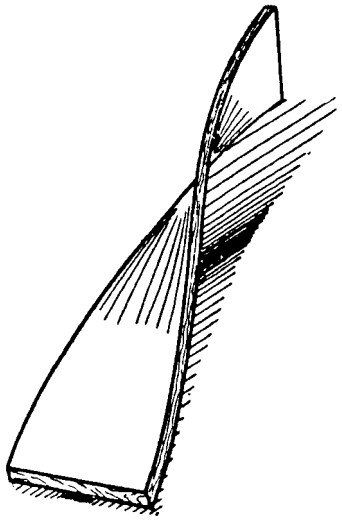


FIG. 32 TWIST

degrade due to all defects present simultaneously in the material under consideration.

**3.486 Unloaded End Distance** — The end distance opposite to the loaded end.

**3.487 Veneer** — A thin sheet of wood of uniform thickness obtained by slicing, rotary cutting or sawing.

**3.488 Veneer Particle Boards** — A particle board with one ply on each side.

**3.488.1** *Veneer Particle Boards, Solid Core, General Purpose* — These are veneered particle boards of solid core with faces of veneer of general purpose etc.

**3.488.2** *Veneered Particle Boards, Solid Core, Decorative* — These are veneered particle boards with solid core but faced on one side or on both sides with decorative veneers.

**3.488.3** *Veneer Particle Boards, Tubular Core, General Purpose* — These are veneered particle boards with tubular core and faced with veneer of general purpose type.

**3.488.4** *Veneer Particle Boards, Tubular Core, Decorative* — These are veneered particle boards with tubular core faced with decorative veneers on one or both sides.

**3.489 Veneer Plywood** — Plywood manufactured by bonding together three or more veneer sheets.

**3.489.1** *Veneer Plywood, Interior Grades* — Plywood suitable for indoor applications.

**3.489.2** *Veneer Plywood, Exterior Grades* — Plywood in which veneers are usually bonded with phenolic resin glue to give weather and boil proof glue line (WBP).

**3.490 Veneered-Wood Boards** — A board having a core made up of solid wood planks, each not less than 80 mm in width, glued or otherwise jointed to form a slab which is glued between two outer veneers with the direction of the grain of the core running at right angles to that of the outer veneers.

**3.491 Vertical Grain Timber** — See **3.366**.

**3.492 Vessel** — An axial series of cells that have coalesced to form an articulated tube-like structure of indeterminate length, whose pits to congeneric elements are bordered. Syn. 'Trachea'.

**3.493 Vessel Lines** — The vessels of wood seen on a longitudinal surface as thin or thick grooves.

**3.494 Volume, Void** — In wood, any space unoccupied by wood substance.

**3.495 Wafer Board** — Special type of platen pressed board, made up of wafers.

**3.496 Wall Plate** — A plate which rests directly upon a wall or offset to a wall to receive and provide fixing for the ends of rafters or joists.

**3.497 Wall Thickness** — Half the difference between outer diameter and inner diameter of the piece at any cross-section.

**3.498 Wane** — The original rounded surface of a tree remaining on a piece of converted timber.

**3.499 Warp** — A deviation in sawn timber from a true plane surface, or distortion due to stresses causing departure from a true plane.

**3.500 Weathering** — Effect caused by exposure to weather.

**3.501 Whiskers** — These are uncut portions of the fibres that are pressed down during cutting (sanding) operations and come out during moistening or damping treatment.

**3.502 Wide-Ringed** — Applied to timber with relatively wide growth rings. Syn. 'Coarse-Grown'. Cf. 'Narrow-Ringed'.

**3.503 Wood** — Used in general sense, whether commercial or not.

**3.503.1** *Non-pored Wood* — Wood devoid of pores or vessels, characteristic of conifers (*see* Fig. 33). Syn. 'Non-porous Wood (*see* Note)'. Cf. 'Pored Wood'.

NOTE — The use of this term is deprecated.

**3.503.2** *Pored Wood* — Wood with vessels typical of broad-leaved trees. Syn. 'Porous Wood (*see* Note)'.

NOTE — The use of this term is deprecated.

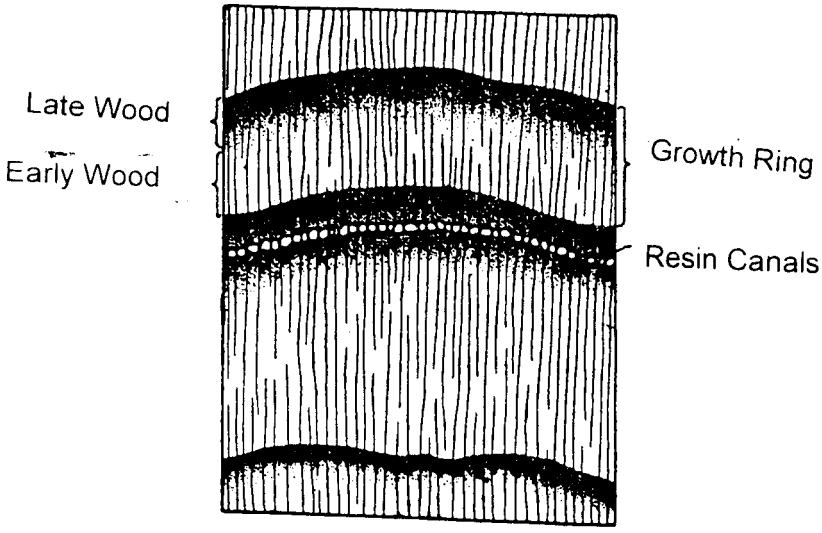



FIG. 33 NON-PORED WOOD

**3.503.3** *Reaction Wood* — Wood with more or less distinctive anatomical character, formed typically in parts of leaning or crooked stems and in branches and tending to restore the original position if this has been disturbed.

NOTE — In dicotyledones this consists of tension wood and in conifers of compression wood.

**3.504 Wood Based Panels (Including Similar Panels from Other Ligno-cellulosic Materials)** — They include plywood, blockboard, flush door, LVL particle board and fibreboard (fibre building board). They may be manufactured from wood in the form of solid wood, veneers, strands, particles or fibres. Bonding agents and other materials may be added during manufacture to improve certain properties. The bonding agent can be an organic binder, as in plywood and particle board, or it may be inherent, as in some fibreboards. Wood-based panels are usually formed in the presence of heat and/or pressure either as sheets of uniform thickness or as shaped or moulded sheets or blocks.

**3.505 Wood Chips and Particles** — Wood, mechanically processed to chips, particles, flakes, etc, for pulping, particle board and fibreboard production and energy purposes. These include the pieces in forms ranging from flat, rigid and roughly squared chips down to small, thin flexible particles.

**3.506 Wood Densified** — Density of wood increased by compression or by impregnating with synthetic resin as improved or modified wood.

**3.507 Wood Particle Board** — Particle board manufactured from particles of wood.

**3.508 Wood Preservation** — See **3.359**.

**3.509 Wood-Wool** — See **3.175**.

**3.510 Wood Wool Cement Board** — Cement bonded board made of wood wool and an inorganic binder pressed together and cured.

**3.511 Wound** — An injury inflicted upon the growing tree which has subsequently healed or occluded.

**3.512 Wrinkled and Deformed Surface** — Deformation in cross-section, during drying, which occurs in immature round bamboos of most species; in thick walled pieces, besides this deformation the outer surface becomes uneven and wrinkled. Very often the interior wall develops a crack below these wrinkles, running parallel to the axis.

**3.513 Xylem** — The principal strengthening and water-conducting tissue of stem and roots, characterized by the presence of tracheary elements.

**3.513.1** *Primary Xylem* — First-formed xylem differentiated from an apical meristem (ordinarily at the edge of the pith).

**3.513.2** *Secondary Xylem* — Wood produced by a cambium.

**3.514 Yield Stress** — The lowest stress at which an extension of the test piece increases without increase of load.

# ANNEX A
(*Foreword*)

## COMMITTEE COMPOSITION

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